

THE IRON AGE

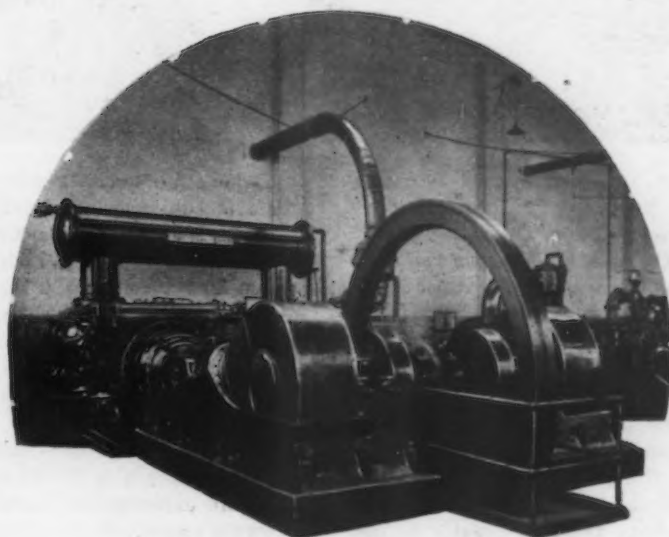
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Economy in Using Air for Power

*Substitution
of Compressed Air
for Steam in the
Operation of
Hammers, Presses
and Shears*



*European Users
Have Gone Far in
Making the
Change, to Re-
duce Their Oper-
ating Costs*

BY PROF. ERNST BLAU*

REPLACEMENT of steam by compressed air, as a motive power in the operation of hammers, presses and shears, has been developed in Europe to reduce fuel expenses in forging. As early as 1921, seven steam hammers with rams of from 250 to 750 kilos (approximately 550 to 1650 lb.) and one forge press of 1000 tons pressure, at the works of Gebrüder Sulzer, A. G., Winterthur, Switzerland, were operated in summer by means of compressed air. All of them are hooked up to a live steam supply of a pressure of seven atmospheres (approximately 90 lb. gage) and are operated with steam during the winter.

Exhaust steam from the units during winter operation is utilized for heating and for maintenance of the hot-water supply. The compressed air used during the summer is supplied by two compressors using 120 hphr. of energy each, delivering at a pressure of 8 to 9 atmospheres (about 105 to 120 lb. gage), and supplying the hammers from a tank of a capacity of 10 cubic meters (about 2650 gal.). A compressor using 50 hphr. further compresses a portion of the air to 13 atmospheres (about 175 lb. pressure) for the operation of the press.

This secondary compressor receives air compressed for the operation of the hammers, supplied from the initial compressors working with interposed coolers. This is delivered at a temperature of 100 deg. C. (212 deg. Fahr.), which drops to 60 or 70 deg. C. (140 to 158 deg. Fahr.) in the storage tank. From this it is drawn and preheated to 200 deg. C. (392 deg. Fahr.), utilizing waste heat from the forge furnace, resulting

in a considerable saving of energy required in compression, the resistance being reduced.

Other Countries Making the Same Changes

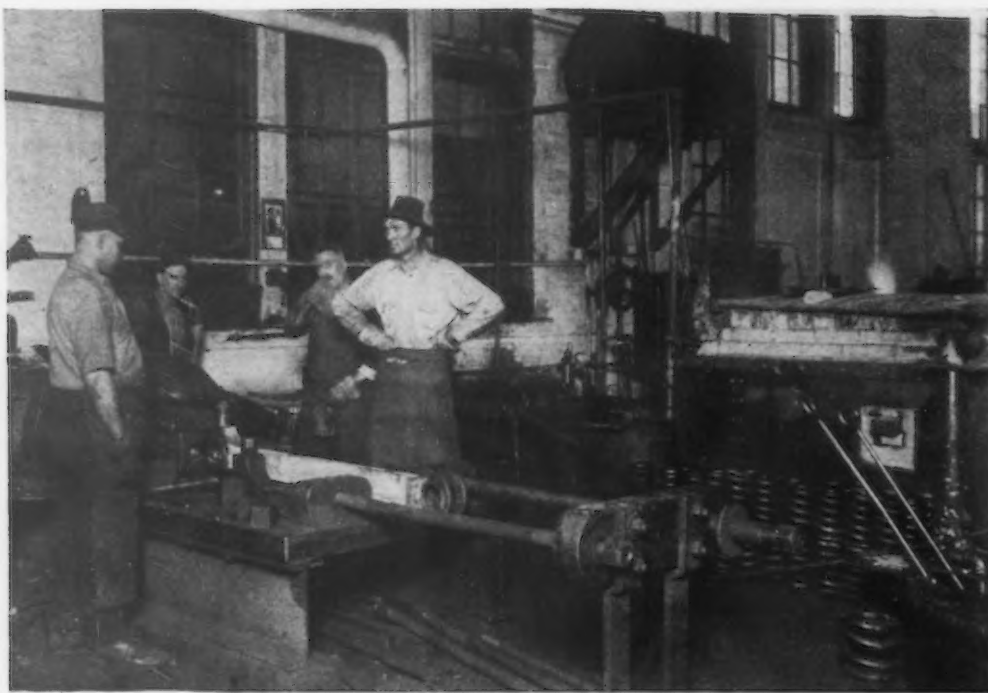
Since that time similar changes have been made in many German, Scandinavian and Czechoslovakian works. In a Scandinavian steel works a compressed air plant for supplying the tools in the foundry was considerably enlarged, to put the hammers and presses, formerly steam operated, on a compressed air footing. Two independently operated electric compressors were installed, of 1000 hphr. power consumption, for each 5000 cubic meters (177,000 cu. ft.) intake at from 8 to 10 atmospheres (118 to 147 lb. absolute pressure). The united capacity of the storage tanks is 350 cubic meters (92,500 gal.). The regulation is based on the fact that, upon a fixed maximum pressure being obtained in the tanks, the compressor is automatically shunted out of commission, starting again only when the pressure in the tanks drops to a fixed minimum limit.

Some of the Advantages Gained

The economy effected by this change in motive power is considerable, especially when the air is compressed by means of power supplied from a public utility plant. No changes are necessary on the hammers, presses or shears. It is but necessary to close the pet cocks or replace with plugs, resulting immediately in stopping leakage losses.

There is a reduction in maintenance costs, as all packing and calking materials will give five to six times the length of service. Furthermore, there is a

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Pneumatically Operated Machine, in a Railroad Shop, for Shortening Main Rods, Side Rods, Draw Bars, etc., by Upsetting. This is in use at McKee's Rocks, Pa., by the Pittsburgh & Lake Erie

reduction, up to 75 per cent, in the amount of lubricating oil used, for in steam operation the lubricating oil is carried away. In compressed air operation the piston rods are not subjected to the same wear as in the case of steam operation, as they are not in contact with condensation water.

A great advantage of compressed air operation is that the medium functions immediately, while in the case of steam operation, time is lost in starting, through condensation. As the forge furnaces are close to the hammers, presses and shears, preheating the compressed air is practicable directly at the place of consumption. At the same time, loss in temperature of the compressed air on its way from the heater to the place of use will be small, even if pipe lines are not insulated.

Limitations on Heating of Air

The degree of heating of the compressed air depends upon the quantity and the temperature of the waste gases, as well as the oil content of the compressed air. When furnished by cylinder compressors, compressed air has a considerable oil content, so that there is a limit to the temperature to which such air can be heated. However, it can be raised considerably by the employment of good lubricating oils of a high flash point. One hundred and eighty deg. C. (356 deg. Fahr.) may be taken as the upper limit. If higher temperatures are desired, turbine compressors are exclusively to be considered for the production of the compressed air, as these rotary compressors furnish an oil-free compressed air.

Even then, however, on account of the lubricating conditions in connection with the hammers, presses and shears, there is a certain limit to the heating. This is found around 300 deg. C. (572 deg. Fahr.) for the compressed air when admitted. Ordinarily, a temperature of about 250 deg. C. (482 deg. Fahr.) should suffice. Without heating and a room temperature of 37 deg. C. (99 deg. Fahr.), the compressed air would enter the tool at an absolute temperature of $273 + 37 = 310$ deg. C.; with preheating, with a temperature of 450 and 525 deg. absolute respectively, according to whether delivered by cylinder or by turbine compressors.

Air and Steam Equivalents

In the operation of hammers 1000 kilos (about 2200 lb.) of steam is approximately equivalent to 1000 cubic meters (about 35,300 cu. ft.) of intaken air. In the operation of presses, however, where larger pieces are worked and the process of forging consumes more time

and where stoppages are longer, the same amount of steam is equivalent to about 700 cubic meters (about 24,700 cu. ft.) of intaken air.

The Allgemeine Elektrizitäts-Gesellschaft (AEG), Berlin, has conducted a series of experiments with smaller (and, later, also with larger) steam hammers, to obtain reliable data for the basis of calculating the amount of compressed air required, as well as for ascertaining the proper type of devices to be operated. The first trials were made with two steam hammers with rams of 600 kilos (about 1325 lb.) and 275 kilos (about 608 lb.) in a North Germany locomotive works. To obtain experimental results of as fair and as satisfactory a character as possible, the hammers were first worked with steam and then with compressed air, on the same day. Identical pieces of material were worked on them, and the working force was not changed.

Details of Test Conditions

On the hammer with 600-kilo (1325-lb.) ram weight, axle rings with shrunk-on hoops were produced. The raw material was ingot iron in block form measuring 105 x 110 x 105 mm. (about $4\frac{1}{8}$ x $4\frac{1}{4}$ x $4\frac{1}{8}$ in.) and weighing 9.6 kilos each (about 21 lb.). The blocks were worked into plates of a diameter of 185 mm. (about $7\frac{3}{4}$ in.) and 44 mm. (about $1\frac{3}{4}$ in.) thick. They were then swaged to 190 mm. (7.48 in.) diameter and 32 mm. (1.26 in.) thickness and perforated by means of a conical mandrel of a diameter of 115 by 105 mm. (4.53 by 4.13 in.) and completed by a few finishing strokes after removal from the swage. The raised seam was from 2 to 3 mm. (0.079 to 0.118 in.) wide and 6 mm. (0.236 in.) thick and the weight of the finished piece was 5.6 kilos (12.4 lb.).

Average time required to produce one piece and bring material for another one from the fire to the hammer was 5 min. On uninterrupted operation the steam consumption by the hammer was 335 kilos (about 739 lb.) an hour. During the time consumed in the test, 101 min., there were 9 min. of stoppage. This made an equivalent of 310 kilos (685 lb.) an hour net steam consumption.

How Compressed Air Compares

In the compressed air operation following, the total working time, including hauling the block from the furnace, was 4.65 min. During uninterrupted operation the hammer consumed 360 cubic meters (about 12,700 cu. ft.) of intaken air an hour. As there was a stoppage of 9 min. during the trial period of 56 min., an effective air consumption of 310 cubic meters (about

10,950 cu. ft.) an hour is shown. With steam operation there was an hourly production of 12 pieces; with compressed air operation, of 12.5 pieces. On the basis of an equal number of pieces the hourly consumption of steam and of compressed air were 310 kilos (about 685 lb.) and 290 cubic meters (about 10,250 cu. ft.) respectively for the 600-kilo hammer.

Experiments were made under identical conditions on the hammer with a ram weight of 275 kilos (about 608 lb.). Round rod was forged, of a length of 155 mm. (6.10 in.) and 35 mm. (1.24 in.) in diameter, two wedges always being worked in one piece and the loops being formed by swaging. The working, including taking from the fire, consumed 2 min. per article. The steam consumption was 262 kilos (about 580 lb.) an hour; the air consumption was 242 cubic meters (8550 cu. ft.) an hour of intaker air.

Using the Steam to Compress Air Electrically

If steam to the amount of 310 kilos (about 685 lb.) instead of being supplied to the 600-kilo hammer be supplied to a steam turbo-generator of a capacity of 2000 kw., with an average actual steam consumption of 5.6 kilos (about 12.4 lb.) per kwhr., it is possible to produce $310 \div 5.6 = 55$ kwhr. With this amount of current an electrically operated cylinder compressor will compress about 10 cubic meters (about 353 cu. ft.) of free air per kwhr. to 8 atmospheres absolute. This makes a total of 550 cubic meters (about 19,400 cu. ft.) of air an hour compressed to 8 atmospheres. As the 600-kilo hammer requires for pneumatic operation only 290 cubic meters (about 10,250 cu. ft.) of air, the saving, $550 - 290 = 260$ cubic meters, is 47 per cent. It was thus possible by means of the steam turbine and the electric compressor to operate also the 275-kilo hammer.

Larger Hammers Similarly Tested

After the tests on smaller hammers, trials were made with 1200-kilo (2650-lb.) and 2000-kilo (4400-lb.) hammers. With steam operation their pressures were 10.4 and 11.4 atmospheres absolute; with compressed air operation, 8.04 and 7.43 atmospheres. On the 1200-kilo hammer dump grate levers were produced, while on the 2000-kilo hammer cube-shaped ingot blocks were worked into dome base angle rings. The trials gave as an average for the 1200-kilo hammer 732 kilos (about 1615 lb.) steam an hour, against 701 cubic meters (about 24,725 cu. ft.) of intaken air; for the 2000-kilo hammer, 2095 kilos (about 4714 lb.) of steam an hour, against 1916 cubic meters (about 67,600 cu. ft.) of intaken air an hour.

The 1200-kilo hammer had a cylinder diameter of 380 mm. (14.96 in.). At a steam pressure of 9.42 kilos

per sq. cm. (about 134 lb. per sq. in.) the active force at the outset of the descent is approximately 7400 kilos (about 16,300 lb.). In case of air pressure of 7.02 kilos per sq. cm. (about 100 lb. per sq. in.), $7400 \div 9.42 \times 7.02 = 5500$ kilos (about 12,125 lb.). The exhaust pressures at the hammer, 0.59 and 0.34 atmospheres respectively, leave the change of the energy actuating the pistons throughout the entire course almost proportional to the initial pressures.

Striking Time One-Third of Total

Accordingly, to make the motive energy equal in both cases, the cylinder filling must be increased in case of pneumatic operation. Therefore in the present instance, in case of equal steam and air pressure, the air consumption during the striking time of the hammer should be reduced by about 26 per cent (from 7400 to 5500). The striking time of the hammer constituted 34 per cent of the total working time on each piece. In the intervening time an air consumption of 6.4 cubic meters (about 225 cu. ft.) a minute was recorded, corresponding to an air consumption of 254 cubic meters (about 8950 cu. ft.) an hour.

Thus, during the striking time exclusively, there was consumed 447 cubic meters (about 15,800 cu. ft.) of air an hour ($701 - 254 = 447$). In consideration of the circumstance that, with higher pressures, leakage losses rise to the extent of from 4 to 5 per cent, 614 cubic meters (about 21,700 cu. ft.) an hour may be considered as the attainable air consumption. This is in case the pressure of the steam and the air are equal.

In the case of the 2000-kilo hammer the relation of the pressures is still more striking, at 10.4 and 6.4 atmospheres. The forces above the cylinder pistons of a diameter of 420 mm. (about 16½ in.) were 11,300 kilos (25,900 lb.) and 7000 kilos (15,430 lb.). According to the above, the minimum air consumption varied on striking $(11,300 - 7000) \div 11,300 = 38$ per cent. Further computation carried out as before gives as a final result an air consumption of only 1560 cubic meters (about 55,000 cu. ft.) an hour.

Comparisons of the Two Methods

In this manner the following comparative data have been arrived at: For hammers up to 600 kilos (1325 lb.) and up to 2000 kilos (4400 lb.) and for steam-hydraulic presses the steam consumption for each is 1000 kilos (2200 lb.) an hour, while the air consumption is 930, 800 and 675 cubic meters (32,800, 28,250 and 23,800 cu. ft.) an hour.

With 1000 kilos (2200 lb.) of steam a turbo-generator taking 5.6 kilos (about 12.4 lb.) of steam per

Air-Operated Flanging Machine at Work on a Locomotive Flue Sheet. The operator's controls are conveniently located. (Our photographs are from Ingersoll - Rand Co., New York)



kwhr. will deliver 178 kwhr. of energy. With this amount experience has proved that, with an electrically operated cylinder compressor, 1800 cubic meters (about 63,550 cu. ft.) of air can be taken in and compressed to a density of 9 atmospheres absolute, all losses having been taken into consideration.

Savings by compressed air operation, compared with operation by steam, are accordingly, in the three cases cited, $1800-930=870$ cubic meters (about 30,700 cu. ft.), or 48 per cent; $1800-800=1000$ cubic meters (about 35,300 cu. ft.), or 55.5 per cent, and $1800-675=1125$ cubic meters (about 39,700 cu. ft.), or 62.5 per cent.

Motor Drive Advantageous

Electric operation of compressors furthermore has an advantage over operation by steam in the fact that the installation of a compressor plant for electrical operation in the foundry is an easy and simple matter, and because a compressor will accommodate itself better to the variable demands that may be put upon it. In addition, the electrically operated compressor will benefit from the advantages of improvement in power production, above all by reductions in the price for electric power supplied, made possible by the use of high-pressure steam, powdered coal burning, etc., in public utility generating stations. For works where a current supply from hydraulic, gas or Diesel engine sources, as well as from distant high-tension generating plants, is available, electricity is the only motive power to be considered for compressor operation.

Instead of making the comparison between steam and air consumption for the same work in terms of kilogram-hours and cubic meter-hours, the volumes of the two should be compared under the presupposition of an equal degree of pressure at the outset, to explain the apparently contradictory fact of a much smaller volume of compressed air being adequate for the forging work.

In two cylinders each closed above by a piston, steam and air respectively are contained at a pressure of 8 atmospheres. The air taken by the compressor has a temperature of 15 deg. C., which temperature rises to 100 deg. C. on being compressed to 8 atmospheres. It is understood that the temperature drops to 50 deg. C. on rest, and that it enters the cylinder at this temperature.

Restricting Maximum Air Temperature

In employing waste gases from the furnace for heating the compressed air, the regularity of attack of these gases does not play any figure when precautions have been taken that the maximum temperature attained by the air will not exceed a fixed point. This is provided for by interposing an air chamber between the compressor and the hammers.

There is danger of the compressed air being heated too strongly when air consumption for forging is temporarily interrupted. In this case it may stagnate in the pipe system and the heater, which continues to function. It is therefore necessary to provide a bypass so that, by means of a regulating slide, the gases may be sidetracked from the heater. This slide can be operated by hand when required, according to the temperature readings of the smoke gases, or upon a bell signal. It is possible also to provide for automatic operation of the slide by means of a contact pressure gage operating an electric motor at the compressed air outlet of the heater.

For the purpose of comparison from an industrial point of view, a more retrospective synopsis may be obtained by comparing the quantities of air with the weight of steam of equal productive capacity, at different temperatures, that is required, instead of the percentage increase in productive capacity of air upon heating.

Instead of 1000 kilos (2200 lb.) of steam an hour, the 600-kilo hammer requires 930 cubic meters (about 32,800 cu. ft.) of intaken air an hour, at a temperature of 323 deg. C. (613 deg. Fahr.); 670 cubic meters (about 23,700 cu. ft.) an hour at a temperature of 450 deg. C. (842 deg. Fahr.), or 580 cubic meters (about 20,500 cu. ft.) at a temperature of 520 deg. C. (968 deg. Fahr.), the temperatures taken absolute; for the 2000-kilo hammer 800, 575 and 500 cubic meters an hour (about 28,250, 20,300 and 17,650 cu. ft.) at the same temperatures, while in the case of the hydraulic steam presses, 675, 485 and 420 cubic meters (about 23,800, 17,100 and 14,800 cu. ft.) an hour. These figures represent average values, as the efficiency of a forge establishment is contingent upon many other circumstances.

Vibration caused by the operation of the steam hammers is transmitted by the steam lines, causing the insulation to loosen and fall off in course of time. This strongly influences the steam pressure. Furthermore, in case of heavy demands on the steam supply the pressure drops, while with small demands the condensation losses will increase. The influence of severe frost, also, will make itself evident in a similar direction. There will be great heat losses in starting up hammers after a long period of idleness. In the case of compressed air operation these disadvantages are not encountered to the same extent. The kilowatt consumption by the electrically operated compressor can be measured accurately by meters.

Unloading Desirable

When the compressed air requirements for the hammers and presses are so regulated that the compressor and motor continue to run after the demand for air is over, until the pressure in the storage tank drops to a certain permissible amount, there is a disadvantage. The dead running of the machines represents 20 to 30 per cent of the full load requirements, and oil and cooling water are not utilized for a productive purpose. In addition, there is the wear and, as the result of the small power factor of the a. c. driving motor at a load of 20 to 30 per cent, the consumption of idle current becomes greater.

To overcome these disadvantages there has recently been an endeavor to provide the driving motor with an automatic control device. By this means it becomes possible to regulate within certain limits the pressure in the supply tank. This arrangement provides for starting the compressor by the driving motor when the pressure in the tank supplied by the compressor drops to a certain fixed minimum, and stopping it again as the pressure attains a maximum limit.

How the Savings Figure Up

The saving in current by the installation of this new system of automatic control in older equipments is considerable, as will be shown by the following: If a compressor built for an air intake of 1100 cubic meters (about 38,800 cu. ft.) an hour consumes 100 kw. on full load and 25 kw. without load, and 0.35 kw. on starting without load, and further, the running time with full load is 5.1 hr., the duration of all stoppages 5.4 hr., and finally the number of daily startings 49, the consumption of power, according to the old methods of regulation for operation with and without load, is 645 kwhr.; while with the modern method of regulation it is 527 kwhr. The saving brought about amounts daily to 118 kwhr.

On the basis of 10 pfennigs (about $2\frac{1}{2}$ c.) a kwhr., there is thus a yearly saving of $118 \times 300 \times 0.10 = 3540$ marks (about \$842). Accordingly, the expense for the installation of the new method of control will be paid for in a short time. In addition, there is the advantage that the motor is always running with a good load, and accordingly working with a high degree of output and a good factor of efficiency.



Tack-Welding Two Panels and Lookouts

Steel-Framed Dwelling Electrically Welded

Stucco Combined with Steel to Meet Problems of Non-Combustible House Construction—All Joints Tack-Welded at Job

By JAMES G. DUDLEY

FOR fully 10 years Europe and America have been faced and "fazed" by the problem of housing shortage. London, Berlin, Paris, New York, Philadelphia and others have been grappling with housing congestion. To this has been added the complication of high cost of living, for all of which a solution is sought in the steel frame house. The problem of the steel house should be no problem at all, if a tithe of the will-to-do were given to it that goes daily into the solution of the minor problems in the steel industry and the building world.

Steel Industry Fails to Take Lead

The complete answer lies in a failure on the part of those most vitally affected—namely, the steel interests—to grasp the complexity, magnitude, economics and psychology of the problem, in their non-support of those "outsiders" who attempt its solution, and in not setting up intensive research of their own to place the steel frame house in its rightful and eventual place before the architectural, building, financial and home-owning world. Since the steel framed house is an economic certainty when the steel house problem is solved in one way or another, this will also prove to be the nearest solution to housing shortage.

General Problems of Modern Housing

Before mere opinions are expressed it is necessary to analyze some basic facts, principles and conditions which today govern homes and housing:

1. It cannot be questioned that a large factor in the present high cost of living is the great indirect tax imposed by the staggering fire losses of over \$2,000,000 per day due to bad construction, combustible construction and defective heating.

Conclusion: The "Dwellings of Tomorrow" must not only be steel-framed but incombustible as well.

2. Housing lumber which has been adequately cured is no longer commercially obtainable save at excessive costs. This results in faulty construction due to shrinking, warping, etc., wherever used.

Conclusion: In the "Dwellings of Tomorrow" cementitious or equivalent sheathing must be used to replace wood even when framed in steel.

3. Settlement of foundation walls has become so common that even engineer-builders of skill and repute claim this to be inevitable.

Conclusion: Even if the "Dwellings of Tomorrow" are steel-framed and incombustible, small advance will have been made unless foundations are made absolutely settlement proof, thereby insuring against cracking.

4. Damp and wet cellars are today so common, even in high grade communities, that "bone-dry" conditions are rarely secured.

Conclusion: Every ounce of steel in the "Dwellings of Tomorrow" must be imprisoned for life in at least "bone-dry," if not hermetically sealed, foundations. Walls and roof or wreckage from corrosion is inevitable.

5. To meet demands of cost reduction, exterior sheathings should be stucco, which outcompetes all other sidings save shingles or clapboards. However, the all too frequent cracking of stucco, due to lack of permanent rigidity in framing and lathing, however built, today compels repairs, rapid depreciation and warranted criticism of even perfect stucco.

Conclusion: In the "Dwellings of Tomorrow" the steel-framing must be permanently and rigidly joined against yielding from weather conditions or settlement.

6. In the mad scramble for cheap houses, the vast

THE author has been engaged in engineering practice for some thirty years, the last ten of which he has devoted almost entirely to research on the steel framed house. Shortly after his graduation from Hobart College, Geneva, N. Y., he collaborated with Prof. R. C. Carpenter, of Cornell University, in the preparation of the latter's first edition of "Heating and Ventilating Buildings." During the war he was research and experimental engineer for two of the Harriman shipyards, and in that capacity designed a 9000-ton electrically welded and electrically powered steam freighter. At this time he was instrumental in bringing about the creation of the welding committee of the Emergency Fleet Corporation, later merged into the American Welding Society. He is now with the Research Engineering Corporation, New York.





Typical Panels in the Making. These units were afterward raised into place and lathing applied

majority not only lack adequate heat insulation but are not even tight against wind penetration.

Conclusion: The "Dwellings of Tomorrow," composed as they inevitably must be of steel, stucco and glass, all having the highest rate of heat conductivity, must perforce have the entire exterior envelope exceptionally well sheathed with some adequate and permanent insulation or invite warranted condemnation on the score of physical discomfort and excessive fuel bills.

7. The many sudden and widely distributed housing disasters, due to violent windstorms throughout the country, demonstrate a fundamental weakness in present methods of making framing joints.

Conclusion: The steel-framing in the "Dwellings of Tomorrow" can scarcely be too well tied together for safety and permanence. The only absolutely dependable jointure is either a riveted or welded one, and the use even of cold rivets, let alone clips or bolts, does not and cannot produce rigid jointures under field conditions.

8. As an aftermath of World War conditions home-seekers now demand some semblance of architectural beauty even at the expense of essentials, regardless of whether this be wise or not.

Conclusion: The "Dwellings of Tomorrow," which embody steel framing with incombustible sheathing inside and out, to become popular and be within the buying reach of the public, must incorporate such a system of construction, technique of building and sequence of operations as to be adaptable to any architectural plan or condition, regardless of merits, demerits or costs. Further, such system must meet occupants' needs and desires such as would be met by any existing system. In short, it must permit the use or omission of every detail structurally desirable.

9. So deep rooted and far-reaching are prevailing methods of installation of conduits for plumbing, lighting, bells, ventilation, radio and heating, that hollow walls, floors and partitions are today practically universally necessary and demanded.

Conclusion: In the "Dwellings of Tomorrow" walls, floors, partitions and roofs must be hollow and so designed and framed as to permit ready installation and concealment of all types of conduits now used.

10. It is true today that union labor can, and in many sections absolutely does, dominate the house-building field.

Conclusion: If the "Dwellings of Tomorrow" are to be based on steel framing, whatever the design, merits or costs, union labor must be won by the "sweet reasonableness" of its own self interest, or a new industrial war is on to the hurt of all concerned.

11. Never before has the heating of homes been so great a factor in the housing field. The fact cannot be controverted that the majority of homes are not even adequately heated.

Conclusion: Since these ultimate steel-framed "Dwellings of Tomorrow" necessarily are based on the

rapid heat conducting building materials in use today, namely, steel and stucco, adequate and economical heating is a major factor in the problem. This holds true also regardless of insulation and fuel employed, since one failure of a steel house to give ample winter warming at no greater cost than for its wood counterpart will be heralded to the four corners of the country.

12. It is a practical impossibility for any man to say accurately what even a given house-design will cost, unless computed by an experienced builder, figuring from exact plans and specifications and for a given location, time limit, season, etc. Nevertheless the home seeker who may build or buy but once in a lifetime does not, and cannot, know this and is all too often influenced by snap judgment or high pressure salesmanship. The result is that today the vast majority of dwellings are in effect made-to-order structures instead of being manufactured on a known unit cost basis.

Conclusion: The "Dwellings of Tomorrow," made of steel and stucco adequately insulated and economically warmed, must and can be reduced to a manufacturing unit cost basis, provided these are built in multiples. Otherwise designing costs, labor and materials supervision, etc., of the newer method, unless written off for promotion purposes, must suffer a serious cost handicap regardless of design or system employed. This is a mathematical certainty provable in advance of construction.

"Weldcrete" Follows Technique of Wood-framed House

The particular construction devised by the author and offered by him as at least one solution of the steel-house problem is illustrated in the accompanying photographs of the first embodiment thereof, which has recently been completed at Teaneck, N. J., for George B. Hitchcock, realtor. In order to disabuse the minds of all investigators at the very outset of any likeness in technique to concrete houses, however built or however meritorious, the author defines and describes this system as "Weldcrete" combining the "weld" from welding with the "crete" from concrete. The welded skeleton steel framing wholly carries all loads, static or dynamic, while the cement in the stucco serves as sheathing only.

Disregarding footings and foundations, this Weldcrete system follows architecturally and structurally, broadly and even in detail, the technique of wood-framed houses. In other words, for each sill, plate, stud, joist, strut, lookout, rafter, ridge, head, jamb, sill, or even trim, member of wood, there is a steel counterpart. All are assembled in essentially the same sequence as is followed in any conventional wood-framed house. While the practice is almost universal to space wood studs, joists and rafters on 16-in. centers, this is neither necessary nor desirable in all Weldcrete steel constructions. With a given house design and method of inside and outside sheathing it may prove more effi-

cient and economical to shrink such steel frame spacing to 12 in. or expand it to 20 or even 24 in.

Standard Metal Lumber Channels

Although it is technically feasible to employ the lightest of standard structural steel shapes for framing members, calculation and actual experience demonstrate that, at least under present steel market conditions, standard "metal-lumber" channels, such as have been on the market for many years, have the fewest limitations for use in Weldcrete houses as framing members. By proper selection of such 3, 4, 5 or 6-in. channels, all of approximately 1/16-in. thickness, any dwelling may be completely constructed from these alone, the four-room bungalow or the multi-family six-story walk-up tenement.

It is a matter of mere clerical routine to take off a bill of materials of all required framing members to be cut square and exact to the dimensions demanded by the specific plans and specifications of the dwelling to be erected. This cutting can be done at a nominal cost either at the mill, at the warehouse or even at the building site, all without a single perforation by punch or drill.

All the steel framing members for the demonstration house shown in the accompanying photographs were ordered thus from the mill. It is evident that this technique permits the widest latitude and flexibility in the translation of the conventional wood framing of any architectural plan into steel-framed counterparts. Gaged by the demonstration house here shown, the entire steel framing, composed of 4-in. channel studs and rafters and 6-in. channel joists, for any usual detached dwelling, totals less than 1/4 lb. per cu. ft. of structure. In passing it is of interest to note that neither in this demonstration nor in any other dwelling employing this technique is it necessary to make use of a single structural item which is not in general use today.

Electric Tack-welds Used Entirely

There are seven more or less distinct types of welding by which engineers can assemble various metals into a machine or structure. These are blacksmith welds, oxy-acetylene welds, thermit welds, electric butt-welds, electric spot-welds, electric fillet-welds and electric tack-welds, the latter being in effect merely fillet welds reduced to the smallest practicable linear and volumetric limits. In the Weldcrete technique only electric tack welds are necessary or desirable, save in unusual and infrequent cases.

The Weldcrete system calls for no overhead welding, nor are the jointures dependent on the shearing strength of the welds. Tack-welds chiefly duplicate the function of the carpenter's nails in wood framing. Each such weld requires but a fraction of a minute to make, with a negligible weight of added metal and a consumption of electric current which is a trifle. The strength of the tack-welds is proved by the fact that a cold chisel, a machinist's hammer and plenty of muscular energy are necessary to break a joint when once so made.

How System Meets Essentials of House Construction

The methods followed in this Weldcrete demonstration or to be followed in other examples can best be shown by meeting the author's own "Twelve Essentials of the Steel House":

Incombustibility is secured by flooring, which should and can be of art-colored cement; inside trim, which

should and can be of drawn metal; doors, of drawn metal with art-designed, unburnable panels, and steel-casement windows.

Wood boarding for rough flooring, and rough roof sheathing, both anchored directly to the metal lumber framing by "expansion nailing" should and can be made so rigid and fire-safe, by art-colored cement finished flooring and color-blended roof shingles, as to remain unchanged throughout the life of the building.

Settlement except of the building as a whole is impossible, due to its erection on a unitary slab of reinforced concrete covering 100 per cent of the excavated house area.

Bone-dry cellars are secured by waterproof compounds integrally incorporated in the reinforced concrete foundation and by walls with waterproof cement finished inner faces.

Exterior sheathing is secured by rigidly anchoring ribbed metal lathing to the unyielding, welded, metal-lumber studs and then incasing these in three-coat, waterproofed, art-colored and art-textured Portland cement stucco, preferably "shot" by a suitable "gun" specially devised therefor.

Insulation of all interior faces of roof and exterior walls is secured by any one of a number of the modern wall-boards having low thermal conductivity which are anchored to the metal lumber framing by expansion nailing. The Underwriters' (inside) "one-hour fireproof rating" is secured by a finish coat of fireproof plaster applied to the wall boards with or without texturing and decorations.

Tornado and earthquake insurance is secured by the action of the thousands of interlocked tack-welds which anchor the hundreds of frame members into one homogeneous structure distributing all such dynamic loads, from ridge to foundation, throughout the framing as a whole instead of to any one section.

Architectural treatment is subject to no limitations of prevailing styles or individual interpretation thereof, owing to the flexibility of the technique of construction. Architectural plans of the simplest or the most ornate character, whether for a tiny cottage or an elaborate mansion, can be executed with fidelity and with a precision scarcely obtainable with any other known system of building. Since the combining of a welded-steel skeleton with a reinforced stucco sheathing lays no restrictions upon the designer, he may even boldly and confidently essay new styles in form, color and texture.

Hollow walls, partitions and roof are an integral part and are secured with greater ease and at less ultimate weight and cost than with other systems which are based on solid counterparts. Further, nothing prevents the use of solid panels, as for closets, etc., if space limitations demand or cost can be lowered.

Union labor has critically investigated this building system and wholeheartedly cooperated in executing its first demonstration embodiment, finding no *casus belli* hidden therein.

Costs of such welded steel and stucco homes can be brought down to the irreducible minimum or to wood costs just so soon as they are built in sufficiently large numbers to permit modern engineering and manufacturing methods to be substituted for the obsolescent, hand-made, retail attempts which now prevail. These welded-steel and stucco "Dwellings of Tomorrow" show annual savings sufficient to amortize their costs in less than 20 years.



Framework Completed With Outside Veneer Being Applied;—the Finished House

Bridge Between Science and Industry

How to Secure Coordination Between Scientific and Industrial Research—Confusion in Use of Metric Terms—Elaborate Apparatus Not Necessary

BY DR. WILLIAM BLUM

DESPITE the numerous efforts in recent years to break down those false distinctions between "pure" and "applied" science that have frequently hindered the progress in each field, we must admit that there are still two fields, however vaguely they may be defined. It is very doubtful whether, even if such a distinction could be eliminated, the result would be advantageous. The types of mind, the educational prerequisites, the environments, and even the physical equipments required on the one hand for the establishing of new and fundamental principles of science, and on the other hand for their adaptation to and application in industry, are usually so different that it is seldom that both types can be found in the work of one individual or even of a small group.

Correlation and Coordination Required

In order, however, that each group may function properly, and contribute its share to the welfare of humanity, there must be a correlation and coordination of their activities. Without frequent and fruitful contacts with the new developments in pure science, industry would soon degenerate into an era of empiricism.

One of the best means for bringing about the desired contacts is through technical organizations such as the Electrochemical Society, devoted, as our constitution states, to "the advancement of the theory and practice of electrochemistry." It is with a full appreciation of the great value of our papers and discussions on industrial electrochemical processes that I venture the suggestion that we need a greater leavening of papers on the fundamental principles of electrochemistry and allied subjects.

It is an indisputable fact that the average industrial electrochemist does not have the time, facilities, or, if he has been out of college 20 years or more, the mental point of view to unearth and assimilate by himself, from the increasing mass of new facts and theories in the physical sciences, those parts which may aid in the solution of his practical problems. On the other hand the basic investigator, if encouraged to do so, could in many cases explain simply and concisely the scope and conclusions of his researches, and thus facilitate the application of such principles to industries of which he may have but scant knowledge.

"Interpreters" Suggested

In order to correlate science and industry better, it may not be necessary to bring the actual workers in each closer together, provided there are those who will serve as "liaison officers," or interpreters, and will establish close contacts with each group, and endeavor to fit together the needs of one and the results of the other.

It is to that activity, which in a broad sense is covered by the term "industrial research," that I would especially call attention. In some degree every successful industrial process includes three steps, even though these may not have occurred in the chronological order indicated:

1.—It involves certain general principles which in some cases have been clearly defined and have led to this application, while in many other instances such principles have either been long known and their application overlooked, or they have not yet been recognized or defined, though they are being unconsciously applied.

Part of the presidential address at the annual spring meeting of the American Electrochemical Society at Philadelphia in April. The author was retiring president and is with the United States Bureau of Standards, Washington.

2.—The relation of such principles to the requirements of any industry is determined, and the probable conditions for their favorable application are predicted.

3.—The feasibility of economic large scale operations is investigated, and operating conditions are defined. Of these the first step involves fundamental research, the second industrial research, and the third is engineering.

In the following attempt to point out some of the factors involved in industrial research, most of the illustrations have been drawn from the field of electro-deposition, with which I am most familiar. One advantage of this selection is that I have made most of the mistakes to which I call attention, and can thus speak from first-hand knowledge.

Metric Terms Confused with Others

One who is engaged in industrial research soon finds that he must all too literally serve as an "interpreter" of the terms and expressions used in science and in industry. It is excusable, and not surprising, so long as the common system of weights and measures is most largely used in industry, that the workmen and the foremen should employ them in their tasks. But we may well question whether the average works chemist, or even the professional consultants who laboriously (and I hope conscientiously) teach their students the advantages of the metric system, do not lose their convictions too easily when they leave the college walls.

I hold no brief for the metric system in industry and have only respect for the chemist who translates the results of his laboratory tests into terms that the layman in the plant can use. But in the laboratory, where the chemist reigns supreme, and where all his measurements of weight and volume are of necessity conducted in metric units, just why should he cut a sample of sheet metal 4 by 6 in. for a corrosion test? If he really believes that the metric system is too cumbersome or inconvenient, why does he not order a set of pharmaceutical weights and use vessels graduated in fluid ounces and fractions?

Why Use Hybrid Units

Not being a psychologist, I cannot even suggest a reason, valid or otherwise, for the frequent use by chemists of hybrid units, such as milligrams per square inch, for the supposed benefit of the foreman or workman. The obstinacy with which such hybrid units are retained in laboratory reports and even in submitted manuscripts may well remind one of the best known of our common hybrids!

Another, only slightly less obvious conflict between the usages in science and industry, is in the expression of concentrations. Here again, so long as ordinary units are employed in the plant, such expressions as "ounces per gallon" are perfectly definite and justifiable, even though the laboratory results are obtained in grams per liter. But when the chemist talks about a "ten per cent solution," does anyone (including often himself) know whether he means ten grams of the salt in one hundred grams of solution, or in one hundred cubic centimeters of solution, or in one hundred cubic centimeters of water?

You may consider that the above examples, which could be multiplied many fold, represent trivial illustrations, and have little or no practical significance. Nevertheless I venture the suggestion that just such minor lapses as these are largely responsible for the gap between science and industry.

Another quality, especially needed and often lacking in industrial research, is a sense of proportion. In the

determination of fundamental constants of nature, it is generally desirable to obtain the highest possible accuracy, which demands a precision in each factor commensurate with its probable effect upon the final result. In such work the result is itself the goal, and no effort should be spared to attain the highest accuracy. In industrial research, however, the justification for any given study is its possible or probable utility for a given purpose. The precision to be sought in any such work must therefore bear a relation to the problem as a whole, though not necessarily limited to present requirements.

Need of Elaborate Apparatus a Fallacy

One of the most common fallacies in industrial research is the assumption that elaborate apparatus for reproducing the plant conditions on a semi-commercial scale must always be provided. Thus we often hear the statement that "a certain result may be true for beaker experiments, but it does not apply to large-scale conditions."

Any such conclusion, if warranted, is simply an evidence that one or more variables in the plant are different from those in the laboratory experiment. It is reasonable and highly important to make preliminary observations on existing large-scale processes in order to determine what factors are involved and which deserve investigation, either from the standpoint of improving an existing method or of developing a competitive method. As my predecessor, Dr. F. M. Becket, has so admirably pointed out in his presidential address of last year, engineering cost estimates should play an important part in the selection of a subject for extended industrial research or engineering development.

In this discussion of the conditions surrounding industrial research, I have considered chiefly the mechanics of the operations, rather than the scientific principles or methods to be pursued. Obviously these depend so much upon the nature of the problem and the state of knowledge in that particular field that few sound generalizations can be made. One of the most difficult decisions to make in any such investigation is whether to study closely the current processes in order to determine their limitations and possibilities, or whether to go far afield in the search for radically new

principles or procedures. There is much to be said in favor of each course, and expediency is often the determining factor. The first is the safe course, as it is sure to yield results of some definite value.

How Radical Improvements Will Come

All research involves uncertainty and risk, otherwise there would be no real problem. It is only through a study of related or even apparently unrelated fields of science and industry that radical improvements are likely to be made. It is here that the greatest responsibility and opportunity of the "industrial researcher" are involved. The ideal investigator of this type (who of course does not exist) should be broadly educated, should be at least acquainted if not familiar with all recent developments both in science and industry, and should have the uncanny knack of making a good guess as to which of the innumerable possibilities for progress is most promising.

Just at present we are having a wave of iconoclasm in literature, science and society as a whole. We read the "Private Life of Helen of Troy"; we learn that the famous "Microbe Hunters" were human beings and not demi-gods; the layman is penetrating into the mysteries of science and realizing that the scientist is no superman, but simply a painstaking, patient student of the laws of nature.

To the extent that this attitude of the public removes the mysticism from science, and makes the scientist himself more human, it is contributing to the progress of humanity. But if it over-emphasizes the "machinery" of research, and ignores the spirit of research, whether in pure or applied science, it is substituting the husk for the kernel.

Industrial research should have a goal beyond the salary of the investigator or the dividends of the employer. It should strive to serve also the worker in the plant, to make his lot safer and happier; and to aid the general public through economies and improvements in quality that contribute to the welfare of humanity. What Thomas Browne said of the medical sciences, in his quaint "Religio Medici," is just as appropriate to the application of science in industry: "No one should approach the temple of science with the soul of a money-changer."

Master Brand Galvanized Sheets Unpopular

Jobbers Object to Carrying Duplicate Stocks; Fabricators Demand Flexible Coatings and Buyers a Cheap Article

IN the last issue of ZN, the periodical issued by the American Zinc Institute, is contained the text of an address given before the spring meeting of the institute by C. L. Patterson, secretary of the Sheet Steel Trade Extension Committee, bearing upon the problems of galvanized coatings on sheet steel. He noted that while the greatest lost market lies in galvanized sheets, this classification comprises only about one-fourth the production of the contributing members of his organization, and consequently can get only its share of attention. Sales of galvanized sheets are about stationary, whereas production of other kinds of sheets have been on the increase.

To reach the field of building construction, Mr. Patterson's committee has prepared accurate specifications for cornices and circulated them among architects and builders. It has also started a movement for the painting of eaves troughs and downspouts on the inside before marketing, to reduce corrosion from water drip. The idea that a galvanized roof needs regular painting is being promoted, and studies have been undertaken to develop a paint which will adhere to new galvanized sheets. Preparation of standards for sheet metal farm buildings has also been undertaken in response to a demand from agricultural colleges.

This program, together with publicity directed toward the farm and household field, represents a new effort. In the past two years the program of the Sheet Steel Trade Extension Committee was based on

the belief that the sheet metal contractor is the key man in the industry, whereas Mr. Patterson now feels that the contractor is primarily a mechanic, and it will be a hopeless task to make him a better merchant.

In THE IRON AGE for May 7 and 14, 1925, a project to market "Master Brand" sheets was favorably reported. They were to be stamped individually, to consist exclusively of prime sheets galvanized on No. 28 gage and thicker, and to be rigidly inspected for thickness of zinc coating, which was to be the maximum possible to be carried without cracking and peeling during normal forming and fabricating operations. Mr. Patterson now feels that this project has not brought the anticipated success.

"The one measure which we expected to be most effective in reestablishing galvanized sheets in the confidence of the public, namely the Master Brand, had been put through only so far as making agreements with our manufacturers for the use of the brand, and writing specifications for all gages of galvanized sheets," said Mr. Patterson. "But the jobbers offered so much opposition to carrying the Master Brand sheets with their heavier coatings, in addition to the commercial sheets, that, reflecting their objections back through the sales departments of the steel companies to the managers, there resulted a cessation of all activity toward the production of these Master Brand sheets."

"The objection of the jobbers was based on the

proved facts; first, that the use to which the sheets in their warehouse was to be put is never known in advance by the jobber and most generally not by the customer who buys the bundled sheets; second, the light coatings now in use will generally stand most of the operations of bending and forming to which sheets are put, but for some operations even these coatings are too heavy and peel or flake off.

"There is a tendency for these operations to become too difficult for the galvanizing to withstand, not only because of the bends being made more carelessly, but also because of the employment of automatic machinery which makes these bends very much more quickly, thus giving insufficient time for the flow of metal to occur. The jobbers having at the moment little or no consumer demand for heavier coated sheets, and the certain knowledge that the heavier coated sheets would not be satisfactory for many purposes under present ideals of design and manufacture, made very pronounced opposition on the grounds of self-interest against the greatly increased stocks which they would have to carry if they stocked the Master Brand sheets.

Modified Field for Master Brand

"The consequence of this decided sales opposition was that the Master Brand sheet with all of the advertising of it that has been done already, and with the continuous references which we still make to it, will either have to be dropped completely or will have to be promoted in a modified form.

"We know from our market analyses that there are dry sections of the country where the very lightest coating and thinnest steel sheets last for many years as roofing without rusting out, but there are other and more numerous sections where sheets do not last satisfactorily with their present coatings. Nevertheless,

the great bulk of the demand for roofing sheets at the present time is for exceedingly cheap sheets, and to sell these people the idea of quality is bound to be a slow and expensive undertaking, even though a very necessary one. One fact of importance in this connection is that in the agricultural field, which constitutes a very large percentage of the total use of such sheets for roofing purposes, over 50 per cent of the farms in this country are worked by tenant farmers. Therefore a very special type of advertising will have to be devised which will reach the owners of these tenant farms.

"In the meantime, however, as a practical measure of importance to the sheet steel manufacturers and as a means of holding and recovering a considerable part of the market for the covering of steep pitched roofs, we wish to see the Master Brand applied to two forms of roofing, namely, corrugated and V-crimp roofing, neither of which usually receive, once they have been formed, any severe or quick bending in their later joining or application.

"In 1926 corrugated and V-crimp roofing took up about 40 per cent of the total production of galvanized sheets and amounted to about 300,000 tons."

Mr. Patterson expressed a belief that economies in the amount of zinc placed on sheets was in line with equally severe economies practiced in other branches of the steel industry, and caused by severe competition for business rather than by any animus against zinc. But in order to check the inroads of substitute roofings and siding, something like the Master Brand movement must be vigorously pressed, and the public reeducated to the fact that a more durable metal costs more money, but is worth it. Two associated researches are also necessary, first, to secure a ductile zinc coating, and, second, to prevent blistering of painted zinc sheets.

What to Know in Buying Die Castings

First Cost Is Not the All-Important Element, Considering That a Poor Die Will Not Give Satisfactory Results in the User's Product

BY CHARLES PACK

BUYING, like any other branch of modern business organization, is a highly specialized art, and fundamentally the general principles of sound and economic purchasing apply to die castings as well as they do to any other purchasable material. This you may accept as an apology for my impertinence in attempting to advise experienced purchasing agents on what may appear to them as simple basic principles of buying. For, I must confess at the outset that I am neither a buyer nor a seller and my experience with the rather complex problem of buying and selling is limited. For almost 20 years, however, I have been in a neutral advisory capacity, having been called upon to advise both the buyer and the seller on the fundamental principles of die-casting practice. It is on this basis, and with these limitations in view that I shall attempt to tell the buyer what he ought to know in purchasing die castings.

First, permit me to cite a well known Shakespearean quotation, because I believe it applies to purchasing and to the purchasing of die castings in particular:

"This above all; to thine own self be true; and it must follow as the night the day, thou canst not then be false to any man."

"To thine own self be true" could be better expressed in the vernacular by saying "Don't fool yourself." It has been my experience that some buyers will buy die castings from the lowest bidder, or discard a satisfactory source of supply on an inducement of a price cut with the full knowledge that the lower price represented only a "paper" saving which may subse-

quently be dissipated by his company in many ways, some of which I will attempt to point out.

"Paper" Savings Sometimes Prove Costly

The temptation of some buyers to show their company officials a paper saving on purchases is sometimes too great to resist. That buyer is not "true to himself"—he is acting contrary to the best interests of his company, and the results ultimately must prove fatal.

In this enlightened age of high business morals and business ethics it does not seem possible that any purchasing agent would deliberately place supply contracts based on a bid which he is certain is below cost and must of necessity entail a loss on the supplier's part. Nevertheless, I have seen contracts for die castings placed where the purchasing agent knew that the price quoted did not cover the metal cost and was evidently based on an erroneous calculated weight. The purchasing agent who follows this policy may show substantial paper savings to his company, but in the ultimate analysis his savings are more than dissipated by express charges, duplicate die charges, follow-up expenses, additional plant operations, inferior product and all of the other attributes of and corollaries to an undependable source of supply.

The buyer of die castings must act as an intermediary between the engineering department of his own company and that of his supplier. The intelligent buyer will have at his command his supplier's trained engineers and metallurgists who generally are more thoroughly versed in the art of die casting than are his own engineers. With the assistance of this outside engineering talent, the buyer is able to make many recommendations to his plant engineers that invariably

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result in substantial reductions in costs. The buyer who will establish such a contact with dependable sources of supply, and deal with his suppliers on a fair and equitable business basis, will always buy the best product and ultimately at a minimum cost.

It is a pleasure to acknowledge the fact that the great majority of successful buyers that I have met do business on this basis. The number of purchasing agents who buy die castings on the "catch as catch can" basis are in the very small minority and it has been my observation that they do not "catch" as often as they are "caught."

Usual Procedure in Buying Die Castings

In large plants where separate engineering and purchasing departments are maintained, confusion and costly delays are often encountered due to the buyer's inability to properly analyze his bids on die castings. As an illustration I will cite the usual procedure in some plants of this type.

The engineering department designs a part and submits blue prints of this part to the purchasing department for bids on die castings. In the absence of any information to the contrary the engineering department assumes that the supplier will deliver castings as per blue print. The purchasing department sends these blue prints to its suppliers with requests for bids. The dependable supplier will carefully examine this blue print, since to him it represents the requirements of the engineering department. Often the supplier will find limits specified by the engineering department that are too close to maintain in the casting operation, or holes and threads specified that cannot be cast. He may also find it necessary to recommend the elimination of undercuts, necessary tapers, drafts, etc. It is customary for the supplier to assume that these changes are permissible and bid on this basis. The conscientious supplier will make careful notation on his bid of the points noted.

When bids for die castings are received by the buyer he should carefully read any notes that may accompany the bid on each part. Invariably the buyer will find it advisable to submit the supplier's comments to his engineering department for its guidance.

Some buyers, on receiving bids, simply compare prices and disregard any accompanying comments. This practice invariably results in confusion and delay when samples are received, since the samples do not correspond with original blue prints, often requiring additional operations, which the buyer's engineering department has not planned for. To avoid any possibility of misunderstanding, confusion or delay, the buyer should insist that the die-casting supplier submit a blue print before starting on the die, showing exactly how the supplier expects to deliver the part. The buyer can then submit this blue print to his engineering department and if approved, he can instruct his supplier to proceed, secure in the knowledge that this item has been disposed of in a satisfactory manner.

Some suppliers of die castings have adopted the policy of bidding on the basis of supplying castings "uncleaned." This may sometimes be hidden in an obscure section of the proposal. Die castings, as they come from the die, will have attached metal "fins," vent flashes, gate runner, ejector pin flashes, etc. By "uncleaned" is meant that the castings will be shipped by the supplier as they come from the die and the purchaser must remove these fins, etc. This often constitutes an appreciable item of cost and in the purchase of die castings the buyer should know definitely just how much work his plant will be required to do on these castings to make a satisfactory product.

In asking for bids on die castings the buyer will find that bids will be more dependable if he will supplement his request for information with as much data concerning the part as he can possibly obtain. The following information is essential to an intelligent bid:

1. Application of part.
2. Service conditions.
3. Present method of manufacture.
4. Material now used, if satisfactory.
5. Surface finish required—if plated, polished or enameled.
6. Approximate yearly requirements.

Buyers should bear in mind that the quantity to be produced represents one of the most important factors in the cost of die castings. They will find it more economical to buy six months' or one year's requirements than to make small monthly purchases.

The buyer should bear in mind that, when placing an order for a die to produce a new part, he is buying something that he does not see and is depending on the supplier to design and construct this die so as to produce the most satisfactory results. It is self-evident that the reliability and experience of the supplier should be carefully considered by the buyer before placing an order. Some buyers, doubtful of the reliability of their source of supply, believe that by stipulating their right to remove the die, they have fully protected themselves. In actual practice this procedure proves futile for the following reasons:

In the production of any die-cast part the design and construction of the die are very important factors. Very often there are fundamental things to be considered that, if overlooked, will result in a die that cannot produce a high-grade product.

The buyer should bear in mind that fundamental mistakes in die design often cannot be corrected unless a new die is constructed. Furthermore, the type of die designed by any supplier will depend to a large extent upon the particular type of casting machine used by this supplier. Very often such die is of no value to a competitive supplier.

Why Dies Should Remain with Supplier

Die-casting manufacturers usually stipulate that the dies must remain in their possession, and while some buyers take exception to this practice, it is based on sound business ethics. When the principles underlying this rule are understood, buyers seldom object to this practice. I therefore outline these principles:

1. Dies are estimated at cost. As a matter of fact, every large die casting plant shows a substantial loss in costs of die construction at the end of each year. For one company to take a loss in constructing tools and then permit another competing company to profit by the use of these tools is not in accord with sound business principles.

2. All the engineering talent and experience of a die casting company are represented in the dies constructed by that company. It would be manifestly unfair to transfer that die, with the trade practices represented by it, to a competing company which has not been called upon to pay for this experience.

3. The composition of the steel used in die construction is a vital factor in the life of such dies. Progressive die casting manufacturers maintain chemical laboratories and are constantly experimenting with die materials. To transfer a die and disclose this vital practice to competitors is not in accord with the best business principles.

4. If the die casting manufacturer did not retain possession of the dies produced by him, it would permit his competitor to underbid him after the former had worked out the "kinks" on the job and brought it up to maximum production. The latter would take over good working dies and cleaning tools with the engineering knowledge represented by them, taking full advantage of that knowledge and experience without any cost to him. On this basis the progressive manufacturer is at a disadvantage, the incentive to improve the process is penalized and the die casting industry must of necessity suffer.

In conclusion, I would like to emphasize that in my experience with purchases of die castings, I have found that the most successful buyers adhere to the following procedure:

Carefully choose one or two dependable and reliable sources of supply. Put your die-casting problems squarely up to these suppliers. Do not attempt to tell your suppliers how to construct the die or what alloys to use. Assume that your supplier knows more about die castings than you do. Tell him what results you want and let the supplier do the rest. If the supplier is progressive and conscientious, you will never have any trouble buying die castings, and although you may not buy cheap die castings, your ultimate die casting costs will be lower than if you buy on the haphazard hit or miss basis.

Transportation Handicap in Steel

Foreign Competitors Favored by Geographical Situation

—Domestic Rail Rates Increased More Than
European—Wide Disparity in Wages

BY PAUL M. TYLER

AS stated in a foregoing article,* foreign transportation charges are characteristically lower than American. Rarely, even in Europe, are ore and coal actually in juxtaposition as they are in Alabama, but generally they are much nearer to one another abroad than in this country. For average long hauls, American freight rates are typically less per ton-mile than elsewhere, and the phenomenally cheap transportation offered by the Great Lakes tends further to relieve the distress of the domestic situation. But the disparity in distances—including the haulage of materials from mine to plant and of products from plant to port—is far too great to be equalized by existing transport facilities. On local switching and for extremely short hauls, foreign freight tariffs are frequently lower than those charged by domestic railroads.

Lake and Rail Freight

For American plants on the shores of Lake Erie, freight per gross ton of ore comprises 91c. for the rail haul from mine (Mesaba) to Upper Lake port and 75c. for water carriage. In addition to this total of \$1.56 per ton, furnaces away from Lake ports must pay a rail freight ranging from 75c. to \$2, the rate to Pittsburgh being \$1.15 per ton. Exclusive of Sparrows Point, a special case, one or two other plants along the Atlantic seaboard can receive foreign ore at their own docks. But even foreign ore must bear ocean freight amounting usually to upward of \$2.50, to which must be added switching charges, if any.

Figures for freight on fuel have to be estimated more or less, because coke, though it is made also at the mines, is coming more and more to be made nearer the point of consumption. The freight charge, therefore, must be distributed partly to the coke and partly to the gas and by-products, which may not be employed in the manufacture either of pig iron or of steel. Giving consideration to these various factors, the cost of transportation per net ton of coke ranges from \$1 in Pittsburgh and even less in Birmingham to \$3.75 in Buffalo, and possibly all the way from \$3.50 to \$5 or more for Eastern furnaces.

Short Hauls in British Practice

In Great Britain the maximum haul on ore or coke is probably in Staffordshire, where it occasionally amounts to 50 miles. Even in the Sheffield area, where distances are greater than they are for many inland plants, one firm reported an assembly cost of only \$2.50 per ton in 1924 as compared with \$1.70 in 1913. At seaboard plants in Middlesbrough or South Wales, rail freight, consisting mainly of switching charges on coke and supplies, amounts to about 70c., but to this must be added ocean freight on imported ore which (though it varies considerably) may be taken at approximately \$1.65 per gross ton of 50 per cent ore.

In Westphalia, since the big plants are almost all

within 10 kilometers of the coal mines, freight on coke is commonly less than 50c. a ton. In the case of Lorraine ore, rail freight at \$1.50 to \$1.75 a ton of ore is equivalent to \$4.50 to \$5 per metric ton of iron. Swedish ore, because it comes by water and because it is not so bulky, costs much less to deliver. It is carried from Narvik, Norway, to Ruhr plants via barge for about \$1.25 to \$1.50 per ton; although quoted on a 60 per cent basis, this ore often carries 66 per cent of iron.†

French Hauls Unusually Short

Furnaces in the leading French producing area are virtually at the mines. While there is some exchange of local ores back and forth, except for that which simply crosses over the Luxemburg border, the quantity of foreign iron ore used for mixing purposes is negligible. A few per cent of imported manganese ore or manganiferous iron ore may be used in making Thomas iron and, sometimes, a little limestone, which may be brought by canal from Belgium. The bulk of the assembling cost for pig iron made in various districts bordering on Lorraine is due to coke. The freight from Westphalia is 10.40 marks (\$2.47) a ton and each ton of iron requires 1¼ tons of coke. The total assembly cost per metric ton of iron is estimated at about \$3.80, which includes local switching on ore, etc. The corresponding figure for Luxemburg is a trifle less.

Low Freight Rates on Belgian Railroads

On the Belgian State Railroads special low rates have always been allowed on ore shipments, so that the cost of transporting 3 tons of ore from Luxemburg and parts of Lorraine to Liège, for example, is only \$2.70. The coke ovens are often at the furnaces, but the coke is made partly from domestic and partly from German coal. German coke is imported, also. Since the distances are short and the rates are low, an allowance of \$1 covers the average freight for 1.1 tons of coke delivered at the furnace, making the total assembly charge approximately \$4 per metric ton of iron.

Table I represents, so far as possible in definite figures, the relative expenditures for transportation in the United States and in the leading producing countries of Europe. The process of arriving at the estimates of pig iron assembly costs has been outlined briefly in preceding paragraphs. While even these figures are necessarily only approximate, they do provide a fairly reliable basis for comparison. In a sense they are synthetic costs derived from what the writer understands to be standard practice in the several localities.

But when it comes to evaluating the subsequent allowance for transportation charges against the fuel and supplies consumed in the conversion of this iron into steel of varying degrees of advancement, the one and only feasible method is to guess twice and divide by two. For this item, therefore, which appears in the fourth column of the table, the writer has simply taken 20 per cent of the assembly cost for pig iron (to allow for scrap and other losses) and then added a further allowance equivalent to the freight on about 500 lb.

*Page 1593, THE IRON AGE, June 2.

†The cost of rail shipment from the mines across Norway to Narvik is not available.

more coal. Although it is obviously excessive for billets and not enough for sheets, and although it does not provide for the not uncommon practice of finishing steel at plants situated some distance away from where the pig iron was made, this estimate is offered with the foregoing apology.

Summary of Freight Charges

Freight charges from plants to port are in part calculated from published tariffs and in part taken from private information in the writer's possession. In all cases they are the special export rates for rail shipments, which are generally much lower than rates for home business. Shipment by barge, although it costs substantially less, particularly in Germany, is not customary for steel products or even for pig iron, at least for export.

As compared with pre-war, railroad freights now are lower in Belgium and about the same in France. In Germany the increases vary, being about 60 per cent on pig iron or semi-finished steel and generally between 25 and 125 per cent on finished steel products. The larger increases are for short hauls; on railroad material, the freight rate for 25 kilometers is actually 193 per cent higher than it was in 1913. British freight tariffs, which were for a long time stabilized at 50 per cent above pre-war, were increased to 60 per cent on Feb. 1, 1927. Special concessions have been made, and more of them doubtless will be made, to the coal and iron trades; the rates on ore and fuel and on iron and steel, therefore, have increased less than those on other commodities. Moreover, one British railroad company, by introducing 20-ton freight cars to supplement the ordinary 8- or 10-ton "wagons" commonly used in England, has been enabled to extend a 5 per cent rebate to large shippers who can use these cars.

Since freight rates on iron and steel commodities in the United States are from 60 to 75 per cent higher than pre-war, and in some instances very much more, the increase in this country has been greater not only in dollars but in percentage of former rates than the increases in the specified European countries except, perhaps, Germany. In other words, the freight handicap of the American industry is greater now than it was before the war.

Ocean Freights Trend Back to Pre-War

Ocean freight rates, which had mostly fallen to pre-war levels or below in 1925, advanced sharply in many instances during the summer of 1926, but dropped again before the end of the year. On ore from Bilbao, the net increase in tonnage rates from January to December, 1926, was only from 6s. to a trifle over 7s. to Middlesbrough, and from 5s. 6d. to 7s. 6d. to Rotterdam. From Huelva to Rotterdam, however, the net advance (after a much greater increase during the summer) was from 5s. 1½d. in January, 1926, to 9s. at the end of the year. From Huelva to Philadelphia the rate was 10s. at the beginning of 1926 and 12s. 6d. in December. Cargo rates from North Africa rose much more than those quoted above.

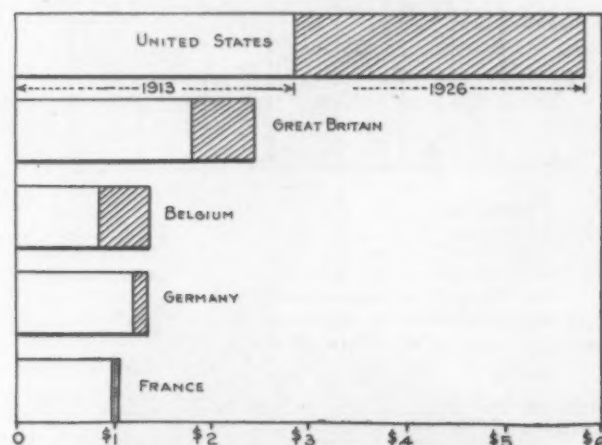
All of these advances were caused by the British coal strike. This strike had the immediate effect of increasing the price of bunker coal. But its more far-reaching influence was to eliminate the coal cargoes which ships under all flags normally find available for shipment from Great Britain to northern and southern Europe, South America, and various coaling stations throughout the world. Lacking the support of these back-hauls of British coal, ocean rates rose promptly. With the resumption of British coal exports, however, the considerable surplus of cargo space remaining from war-time ship-building is again beginning to assert itself, with the result that rates are coming back to normal. Not only because of competition, but also because

of economies in ship operating expenses, this new normal promises to be not far from pre-war.

Wage Comparisons Often Misleading

Of all the different factors in production, the one most discussed is labor. It is also the one which, next perhaps to managerial skill, varies the most. Relative wages as paid in different localities furnish little information as to costs of production. Most economists tell us that labor tends to get what it is worth and that labor costs, therefore, are likely to be more or less the same everywhere, regardless of what may be the nominal rates per day. The steel industry itself has provided some of the best examples in which high wages in the United States have been more than offset by greater economy in man-power. But wages in the steel industry are dependent upon wages in other industries, and in each country the general wage scale depends partly upon established customs and partly upon the state of industrial activity—generally to a far greater degree than it does upon the output of steel or pig iron per man per day.

Since foreign plants have adopted American labor-saving devices, the American industry has doubtless lost some portion of its former advantage with respect to output per man, but so long as some of this advantage undoubtedly still remains, lower wages in foreign countries do not indicate that costs will be lower in anything like the same proportion. The writer, although he has long been accumulating data upon relative productivity in this and other countries, has not as



Average Wage Rates per Shift in Iron and Steel Industry in 1913 and in 1926, Showing Great Increase, Particularly in the United States. In France there was a decline

yet succeeded in reducing a simple statement that will cover the iron and steel industry as a whole.

Wages Hard to Compare

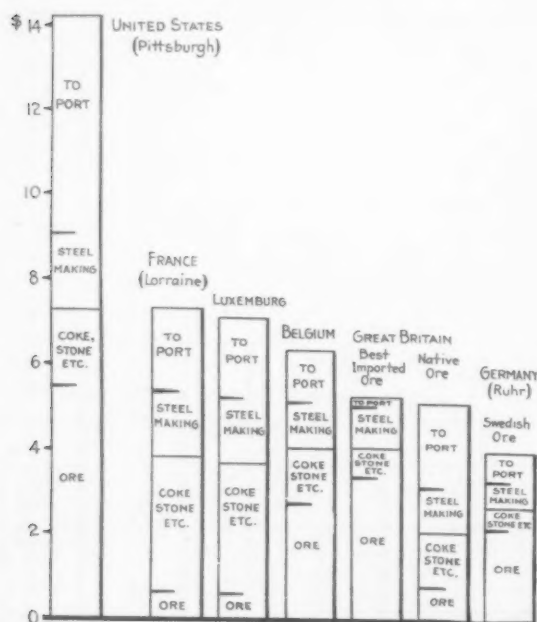
Even in the matter of wages, if due allowance be made for different methods of manning the mills here and abroad, an absolutely satisfactory comparison requires so many figures as to make it confusing. Moreover, since earnings are dependent in most countries upon output or selling prices or both, these matters must also be kept in mind. In Great Britain, especially, wages in substantially all occupations in the iron and steel industry are on a sliding scale based upon the prices of products. In prosperous times, the principal classes of labor in smelting and rolling steel in British works have earned about as much as similar workers in the United States. But, as may be seen from Table II, these are not prosperous times in Great Britain.

Table II shows the average wages of all iron and steel workers in each country, the figures in most instances being calculated by taking total pay rolls and dividing by the number of man-days.

If we dismiss wage rates, or if one assumes that

American ingenuity and good management can devise labor-saving equipment and new methods fast enough to keep our practice far enough ahead of European to offset this factor, we come back to the consideration of natural advantages. The relative cheapness of pig iron and crude steel produced in French Lorraine and Luxemburg is explained by the relative cheapness of the ore. This in turn is due not so much to low wages as to the fact that mines and furnaces are so close together that transportation is reduced to a practical minimum.

Freight handicaps shown in Table I for the United States, Great Britain and Germany, and to a less extent for Belgium, tend to explain the steady outflow of pig



Transportation Costs for Steel Made in the United States and in Europe. Below the solid dividing line the freight charges are for making one metric ton of pig iron. Above are the freight allowances for making that ton into steel and for shipping finished steel from works to nearest port

iron and the bulkier kinds of steel from France by way of Belgium. At the same time they also bring out one of the principal causes which have forced both Great Britain and the United States, and, to some extent, Germany also, to specialize in their export trade more and more upon highly finished qualities of steel. As the product gets further and further away from the raw material, cheap fuel, large scale production, and a multiplication of minor economies offer more and more opportunities for overcoming the initial handicaps dictated by geography and natural resources.

Table II.—Average Wages Per Shift in the Iron and Steel Industry in Various Countries, 1913 and 1926

Country	1913 (10 to 12 hr.)		1926 (8 hr.)	
	Dollars	Index (United States =100)	Dollars	Index (United States =100)
United States..	\$2.85	100	(a) \$5.82	100
Great Britain..	1.80	63	2.45	42
Belgium	0.85	30	1.36	23.5
Germany	1.20	42	(b) 1.35	23
France	1.05	37	0.98	17

(a) All works employees of United States Steel Corporation.
(b) For 8 hr.; actual shift, 10 to 12 hr.

What Chemistry Contributes to the Automotive Industry

"Chemistry's Contribution to Automotive Transportation" will be the theme of a three-day national symposium to be held beginning Tuesday, Sept. 6, in connection with the seventy-fourth meeting of the American Chemical Society at Detroit.

"The purpose of the symposium," says the announcement by Erle M. Billings, of Rochester, N. Y., secretary of the society's industrial division, "is to bring together into one place a survey, or a capitulation, of just what chemistry and its allied sciences have already contributed to the materials employed in automotive transportation, and to suggest, if possible, some things that they may still contribute."

Among the speakers and their topics at the symposium, which is being arranged under the direction of Dr. Thomas A. Boyd, director of fuel research, General Motors Laboratories in Detroit, will include:

Dr. J. A. Mathews, vice-president Crucible Steel Co. of America, New York, "Iron and Steel"; Dr. H. W. Gillett, chief metallurgist United States Bureau of Standards, Washington, "Non-ferrous Alloys"; Francis C. Frary, director of research Aluminum Co. of America, New Kensington, Pa., "Aluminum and Its Alloys"; W. C. Geer, former vice-president B. F. Goodrich Co., Akron, Ohio, "Rubber"; E. W. Tillotson, assistant director Mellon Institute, Pittsburgh, "Glass"; H. C. Mougey, research laboratories General Motors Corporation, Detroit, "Paint, Varnish and Lacquer"; J. B. Hill, chief chemist Atlantic Refining Co., Philadelphia, "Fuels"; L. W. Parsons, chief chemist Tide Water Oil Co., Bayonne, N. J., "Lubricants"; and William Blum, United States Bureau of Standards, Washington, and former president American Electrochemical Society, "Plating."

Navy Offers 1600 Tons of Plates

About 1600 tons of steel hull plates will be sold by the Navy Department at the Navy Yard, Philadelphia, sealed bids to be opened Tuesday, July 26, at 10 a. m. The plates are of miscellaneous sizes, widths ranging roughly from 60 to 96 in. and lengths are from 252 to 432 in. Alternate bids are requested, one covering removal by the purchaser and the other requiring loading to be done by the Government.

Table I.—Transportation Costs for Foreign and Domestic Steel

Locality	Assembly Costs per Metric Ton of Pig Iron			Additional		Total Freight Cost per Metric Ton F.o.b. Port
	Freight on Ore (a)	Freight on Coke (a)	Total (b)	Freight Allowance for Making Into Steel	Inland Freight to Port	
United States: Pittsburgh	\$5.50	\$1.30	\$7.30	\$1.80	\$5.10	\$14.20
France—Lorraine	0.60	3.10	3.80	1.50	2.00	7.30
Luxemburg	0.55	3.00	3.65	1.50	1.90	7.05
Belgium	2.70	1.00	4.00	1.05	1.25	6.30
Germany—Ruhr: Swedish ore	2.10	0.40	2.60	0.60	(c) 0.75	3.95
Great Britain: Best imported ore	3.30	0.55	4.00	0.95	0.25	5.20
Native ore	(d) 0.75	1.00	2.00	0.65	2.40	5.05

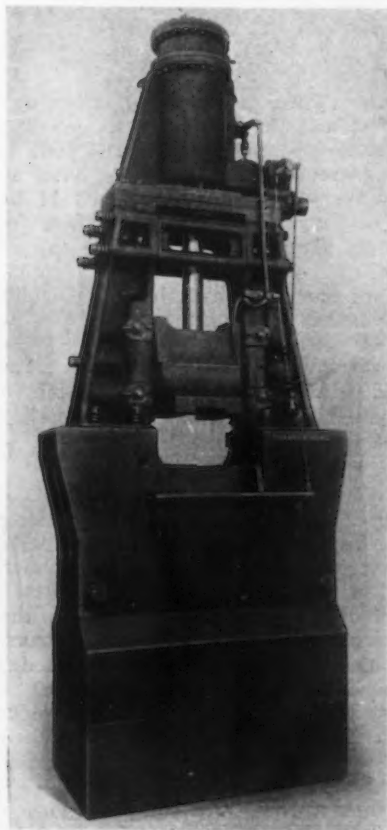
(a) On quantity necessary per ton of pig iron.
(b) Including allowances for stone and supplies.
(c) From 60c. (barge) to \$1.44 (rail).
(d) Inland plants.

Exceptionally Large Hammer for Forging Valve Bodies

What is said to be the largest and most powerful steam drop hammer in the world was recently built by the Chambersburg Engineering Co., Chambersburg, Pa., for the Crane Co., Chicago. This hammer will be used exclusively for drop forging valve bodies for high-pressure steam duty.

The total finished weight of this hammer approximates 536,000 lb. The total height from bottom of foundation to top of hammer is 48 ft. 6 in. Overall height of hammer is 32 ft. 6 in. and the timber- and concrete foundation built to receive it is 16 ft. deep.

With 100 lb. mean effective pressure, the energy



To Avoid Transportation Difficulties the Anvil of This Large Hammer Had to Be Made in Three Pieces, Which, on Assembly, Are Dovetailed Together. The total falling weight is 29,000 lb.

in the ram at the instant of impact on full stroke is estimated at 428,000 ft. lb. Its rated size without top die is 22,000 lb. As the estimated weight of top die is 7,000 lb., it has a total falling weight of 29,000 lb. To facilitate handling and transportation, the anvil, weighing 440,000 lb., is made in three pieces, with a 20-to-1 ratio.

The main members of the hammer consist of acid open-hearth steel frames and anvil top. The bottom anvil sections are semi-steel and the cylinder is semi-steel with air furnace cast iron bushings. The ram and anvil cap are selected open-hearth steel forgings specially heat treated. The piston rod, all bolts and other important connections are specially treated alloy steel.

The cylinder is 30-in. bore by 52-in. stroke, with piston rod 11 in. in diameter. Distance between guides is 46 in. The ram, front to back, measures 48 in. The frames are of I-beam construction, tied into the anvil with positive stops and compound wearing wedges. The tops of the frames are tied together with interlocking tie plate and double tie bars.

Guides of steel, with four V's, are of universal adjustable type, which permits ready adjustment without shutting down the hammer. Guides may be moved back into the frames to permit removal of ram in any position without disturbing the frames or cylinder assembly, and may also be removed without removing rod from ram.

The cylinder is locked into the tie plate on its base and is fitted with balanced piston-type operating valve. It is also equipped with patented safety cylinder cover. Piston rings may be replaced or in-

spected without removing rod from the ram. The cam mechanism is of the latest one-piece construction, and the cam bears on a solid cam face machined on the ram.

New Burner for Powdered Coal

Designed to handle powdered coal more rapidly, without increasing the draft, a new burner has been placed on the market by the Peabody Engineering Corporation, 110 East Forty-second Street, New York. This burner was designed particularly for a new power station of the Ohio River Edison Co., Toronto, Ohio. It is expected to produce an even feed of coal into a turbulent quick flame and to achieve satisfactory combustion efficiency.

Coal is introduced through a rectangular inlet into a burner barrel with screw-thread vanes. In this it differs from earlier burners. The interior arrangement gives the coal an even distribution into a blast of combined primary and secondary air whirling through the barrel. The secondary air is introduced through a slant-waved air register. It is reported that the flame from this burner, when viewed through a peep-hole, shows no stratification and no dark streaks indicating spotty distribution of the fuel.

In the Toronto installation the company reports that coal was burned at the rate of 5000 lb. an hour for each burner, with six burners operating on one boiler. When the number of burners was reduced to four, the rate of combustion was 6000 lb. an hour for each burner. The CO₂ reading was 16 per cent, indi-



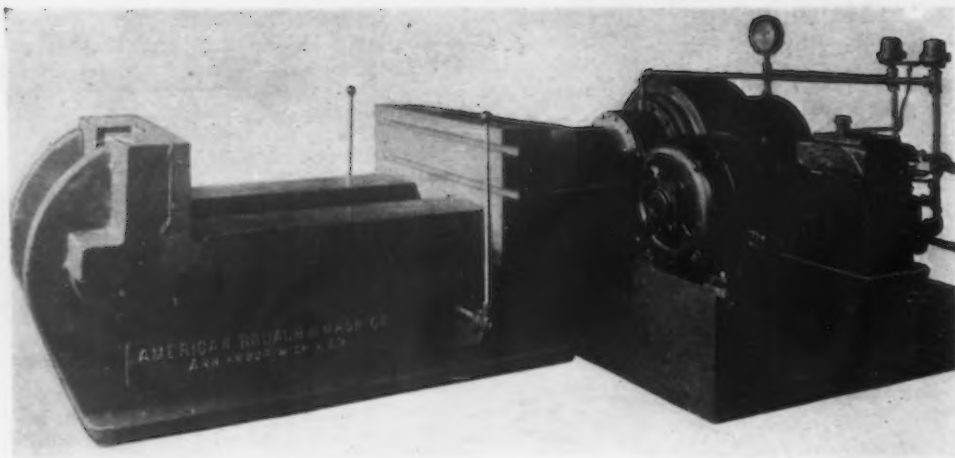
Uniform Distribution and Mixing of Fuel and Air Are Features Claimed for This Powdered Coal Burner

cating close air supply and complete combustion. This performance was at the rate of 30,000 B. t. u. an hour for each cubic foot of furnace volume.

Steam output reached a peak load of 325,000 lb. an hour. This is 445 per cent of manufacturers' rating for the 2200-h.p. boilers. It is reported that there was no slag produced at this high operation.

As this burner can be used with any unit pulverizer or with any kind of feeder from a bin system of powdered coal storage, it is stated by the manufacturer that existing boiler plant capacity may be increased by this means without change in boiler equipment.

"A Study of the Factors Affecting the Electrode Potentials in the Deposition of Nickel" is the title of a paper by William Carleton Ellis, published by Rensselaer Polytechnic Institute, Troy, N. Y. The study was made in partial fulfillment of the requirements for the degree of master of science.



The Speed of the Pressure or Operating Stroke Is 18 In. per Min. The return speed is 36 in. per min.

100-Ton Horizontal Hydraulic Press or Bulldozer

A 100-ton horizontal hydraulic press or bulldozer, equipped with an oil pump, which exerts a maximum pressure of 1000 lb. per sq. in., has been placed on the market by the American Broach & Machine Co., Ann Arbor, Mich.

The pump, which is designated as the size F. W., is driven by a 7½-hp. motor arranged as shown in the illustration. The operating speed, pressure stroke, is 18 in. per min., and the return stroke is 36 in. per min. The cylinder is 16 in. in diameter and the ram 11 in. in diameter.

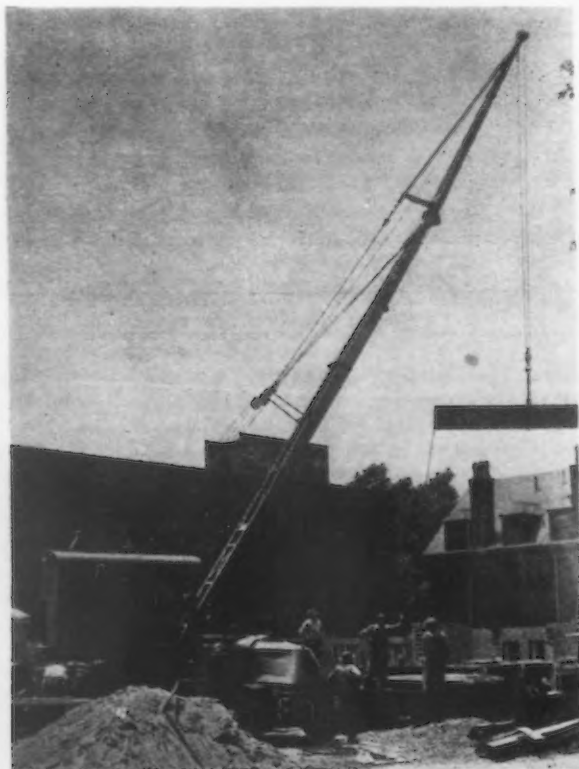
The width of the jaws is 36 in., and the height 11½

in. The stroke of the sliding jaw is 18 in., the width of these jaws, 44 in., and the height, 11½ in. The minimum and maximum opening between the jaws is 32 in. and 50 in., respectively. The ways have an overall width of 36 in., and a sliding surface 11 in. wide on each side, totaling 22 in. bearing surface for the jaws. The height from the floor to the top of the ways is 25 in.

Knock-off stops are provided for setting the machine to predetermined lengths of stroke, serving also to prevent over-run of the ram. A pressure gage, graduated to read up to 25 tons, is furnished. The floor space required is 9 x 14 ft. The weight of the machine complete with motor is approximately 20,000 lb.

Motor-Truck Crane for Handling Steel Erection

Three models of a gasoline-operated portable crane, designed primarily for mounting on any standard 5-ton or heavier motor truck chassis, are put out by Universal Crane Co., Elyria, Ohio. They are designed for material handling, particularly on steel construction jobs and excavating. They have found widest acceptance on erection and construction jobs where steam-operated equipment would be both costly and inconvenient to handle.



Portable Erecting Crane Proves Convenient and Reduces Costs

Various sizes differ in their ability to handle long or short booms, the heavier type being equipped with additional counterweights and outriggers to establish greater stability. The crane mechanism is so mounted that there is a full-circle swing, which enables the operator to complete his job with a minimum of truck movement. It has also been used in loading and unloading freight cars, handling all kinds of material in storage yards, pile driving, drag-line bucket work, laying water or gas lines and setting poles. When equipped with a motor-driven generator and magnet it can be used for handling scrap.

On excavation work it is usually equipped with a ½-yd. clamshell bucket. Its boom comes in standard lengths of 20 ft., 24 ft. and 28 ft., and can be obtained to meet special requirements, such as steel erection in lengths to 52 ft. The photograph shows the large size crane with 52-ft. boom erecting the steel structure of a 3-story apartment house from the ground.

New Pipe Nipple and Bolt Plant

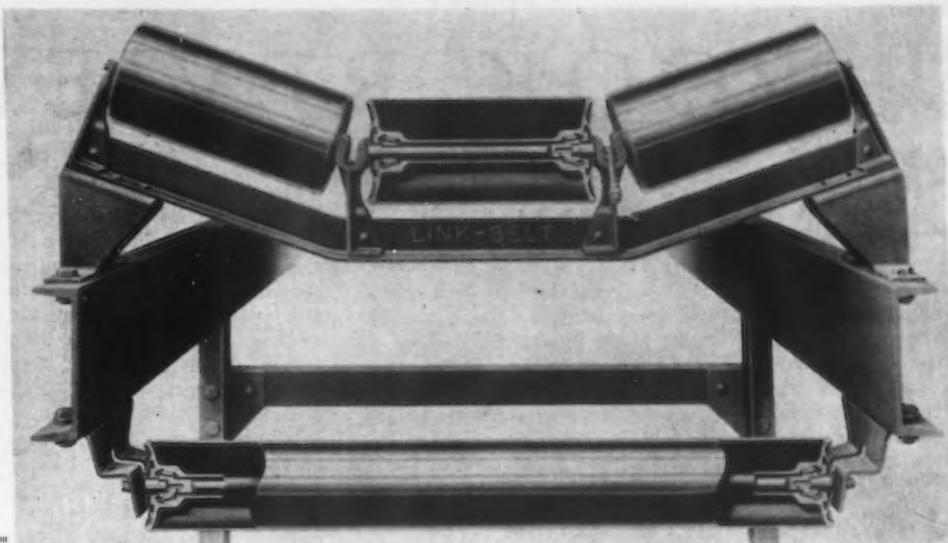
The H. & H. Bolt & Nut Co., Inc., Schuylkill Haven, Pa., which was recently organized, is completing the installation of machinery in a pipe nipple department and will be ready for the production of nipples about Aug. 1. A bolt and nut department for which machinery has been purchased will go into operation later.

The nipple-threading machinery is automatic, having been designed by one of the partners. The company occupies a building of mill construction, 56 x 184 ft., on each side of which there is a Reading railroad siding. The plans call for the building of a forge shop, ground for which has been acquired, in the near future.

The company is composed of Louis Holstein, president, for 21 years with the Eastern Steel Co., Pottsville, Pa.; J. Frank Hay, treasurer, who was connected with the Buck Run Coal Co., Minersville, Pa., and for eight years with the East Penn Electric Co., Pottsville, Pa., and Frank Hartzell, manager, formerly with the Keystone Nipple Co., and later proprietor of the Standard Nipple Co., Hamburg, Pa., which has been taken over by the new company.

The Harnischfeger Corporation, Milwaukee, has 11 of its excavators working on the central Cuban highway, extending almost 700 miles.

The Protection Afforded by the Labyrinth Grease Seal Is an Outstanding Feature. The illustration is of a three-roll troughing idler and return idler, cut away to show construction of the rolls



Announces Anti-Friction Belt Conveyor Idler

A number of advantages are claimed for the anti-friction belt conveyor idler and return rolls here illustrated, which have been announced recently by the Link-Belt Co., 910 South Michigan Avenue, Chicago.

Bearings are Timken tapered roller bearing type, which are entirely inclosed within the roll hub. An outstanding feature of the idler is the protection afforded by a labyrinth grease seal, mounted in a grease cap which also serves as an outboard reservoir and lubricates the bearing on the outside as well as on the inside, especially when the roll is on an incline. This, in turn, is protected by a deflector plate which deflects dust, grit or other foreign material away from the bearings and grease seal, and prevents washing of the grease away from the labyrinth.

The rolls are mounted on a self-cleaning "T" base and are interchangeable, being capable of serving in any of the three positions.

Another feature stressed is the unusually close working tolerances to which all parts are built. Special care is said to be exercised in machining the roll shell,

to obtain uniformity of thickness of the wall into which the machined heads are pressed and securely held in place by spinning. The heads are dished for rigidity and strength. It is claimed that this particular design and construction of the roll make it practicable to vary the characteristics of the material used for the roll shell. A special iron has been developed for use in coke plants, that resists the corrosive action of sulphuric fumes and the abrasiveness of coke dust. The rolls are "granitized" for the handling of salt, alkali and other materials that cause incrustation, pitting and rusting of ordinary steel or iron.

The idler rolls are supported in malleable iron brackets having a large bearing surface for supporting them, and are not dependent upon the use of slots. The brackets are arranged to support the ends of two adjacent rolls, which is said to provide proper alignment of the rolls. Roll shafts are supported at both ends close to the rolls, without overhang, thus minimizing the bending moment. Rolls are spaced far enough apart to permit convenient removal from the frame, this being accomplished simply by lifting them out, the use of tools being unnecessary. Idler rolls are available in various standard lengths, and are furnished in combinations to suit standard belt widths.

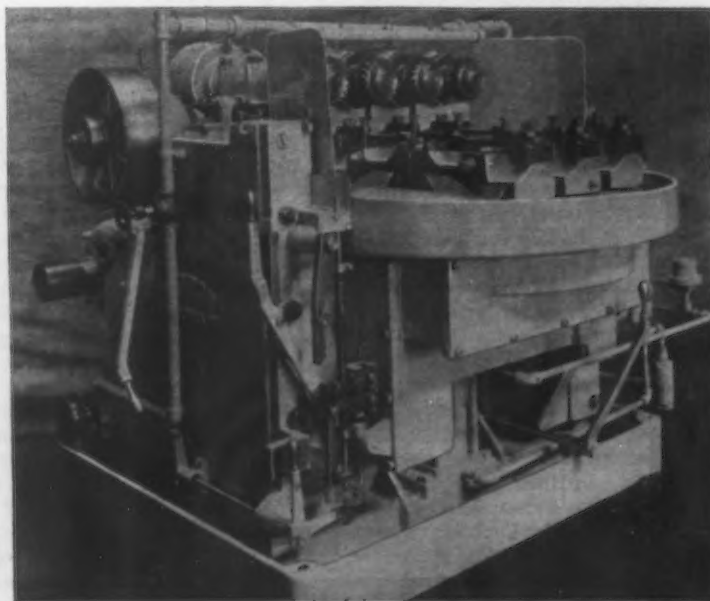
Improved Rise and Fall Milling Machine for Automobile Connecting Rods

Significant increase in production is claimed for the improved rise and fall milling machine here illustrated, which is intended for slitting caps and milling bolt bosses on automobile connecting rods. The machine is an improved model built by the Newton works of the Consolidated Machine Tool Corporation of America, Rochester, N. Y.

New features include the use of "super-accurate" Timken bearings, and separate horizontal adjustment of each of the four heads for varying the center distance. The table gibs are located in line with the cutters and also on the line with the center of gravity of the table, which arrangement is intended to give smoother feed action and greater rigidity. The gibs are entirely protected from cutter coolant and chips, which pass through the base to a pan in the back where they may be removed conveniently.

The table is provided with vertical Oil-gear feed and quick return movement. The feed rate may be rapidly adjusted by a screw on the oil pump. The quick movement is much faster than previously, and the length of quick movement travel is varied by adjustable dogs on the side of the knee. This permits rapid set-up for different sizes of connecting rods, the only mechanical change being in adapting the fixture to suit the rods.

Control levers are so located as to be most conveniently within reach of the operator. Minimum floor space is demanded by the compact design.



The Table Has Two Sets of Fixtures, One of Which Is Loaded and Unloaded While the Rods in the Other Are Being Machined



BOOK REVIEWS



How to Influence Men. By Edgar J. Swift. Pages xvi + 407. Size, 5 $\frac{1}{4}$ x 8 $\frac{1}{4}$ in. Published by Charles Scribner's Sons, New York. Price, \$3.

This is a new and enlarged edition of "Business Power Through Psychology." It starts in to discuss salesmanship, but finds that successful effort by a salesman requires much preparatory work by the house he works for, which naturally leads into a discussion of business practices and management. The author, who is head of the department of psychology in Washington University, St. Louis, discourses on such business topics generally in a very chatty style, rich in cliché, metaphor, and allusion to successful men in all walks of life (including the author himself) and in all ages. For this reason the thread of the argument is seldom clear, and is always embroidered into beautiful patterns of verbiage, repetitive and full of allusions to "popular" science. Being a psychologist, however, the author has probably decided that this is the best way to introduce ideas into the heads of his readers.

It is shown in the book that the "master salesman" (like Lister, Oliver Wendell Holmes and Huxley) were above the rules, because they understood the reasons underlying the rules and adapted their methods to the infinitely varying conditions. Since each prospect is a unique problem in himself, the only rules which apply are generalities so broad as to be almost truisms. Consequently the conclusion reached by the book in its section on salesmanship is this: Work for a good house, know about and believe in what you are selling, and then put yourself in your prospect's place.

If this be psychology, make the most of it!

Much more suggestive chapters are included on "Selecting the Salesman" and on "Personnel Management." Neither is the book without its humorous passages. These comprise the supposedly verbatim reports of remarks made by others; in each instance their conversation is quite psychological.

E. E. T.

The Iron Industry in Prosperity and Depression. By Professors Homer B. Vanderblue and William M. Crum. Pages 193, 7 $\frac{1}{4}$ x 10 $\frac{1}{2}$ in.; 88 diagrams and 92 tables. Chicago, A. W. Shaw Co., 1927. Price \$7.50.

Evaluation of the "barometer of trade" is the ambitious task carried out in this volume. Studies of the month by month production of pig iron from the earliest collected figures (those of THE IRON AGE for October, 1901) to the close of 1926 were taken as the base. In addition, corresponding figures for the principal producing districts were taken into account, each being studied separately. Thus the work covers not only the country as a whole, but also conditions in each such district. Several of the preliminary studies were published in THE IRON AGE in 1925, that covering the United States as a whole in the March 26 issue, page 896. The trend on the Eastern Seaboard was covered at page 210 of the July 23 issue, while that at Pittsburgh appeared Dec. 10, page 1598.

Part I of the book deals with prices and production of iron and steel in the entire United States. Part II takes up the regional production of pig iron in the various production sections, while Part III deals with forecasting conditions in the industry. Appendices explain the technical methods involved in the analysis, show the localized character of the industry and give a number of supplementary tabulations, including changes in unfilled orders of the Steel Corporation, imports of pig iron into the United States monthly for a long series of years, production and price of coke, etc. Tables II and III in Part I are respectively THE IRON AGE composite price of pig iron and THE IRON AGE composite price of finished steel.

Monthly production of pig iron for the country and for the various producing districts has been subjected to statistical analysis from which was derived a

straight line trend characteristic for each set of figures. That for the United States shows a steady rise from about 1,500,000 tons a month in 1901 to 3,150,000 tons, or more than twice as much, in 1926. This line, called the long-time-trend, is the base above and below which seasonal movements vacillate. Having the trend and the coefficient of seasonal movement, it is easy then to evaluate the month by month production figures in terms of percentage of what would be expected and thus ascertain whether production is above or below normal, and by what amount. On this basis production is shown to reach at times 40 per cent above normal, as in the fall of 1916, and nearly 70 per cent below normal, as in the summer of 1921. The cyclical swings above and below normal are clearly defined in such a curve and the amounts of movement away from normal easily discerned.

As a supplement to this part of the work, cyclical indexes of steel ingot production have been developed in the same manner, covering the period from June, 1917, when ingot production figures first became available, to the close of 1926.

Not all districts shared in the general run of prosperity evidenced by the 110 per cent rise of the long-time-trend. One district, that of New Jersey, showed an actual decline from 23,000 tons a month in 1901 to 7000 tons in 1924, since which date there has been no production. The trend line of the Susquehanna-Lebanon district is practically horizontal at about 46,000 tons per month. The two other eastern districts showed substantial gains, the Lehigh going from 53,000 tons a month to nearly 90,000, while the Schuylkill district advanced from 39,000 tons to 84,000. Similar gains were shown in the Pittsburgh, Western Pennsylvania and New York districts, that for Pittsburgh advancing from 390,000 tons to 670,000 tons a month, that for New York from 75,000 tons to 225,000 tons a month, or at a greater rate than for the country as a whole, and that for Western Pennsylvania from 90,000 to 160,000 tons a month.

Rapid increase is shown by the Mahoning district, which went from 115,000 tons a month in 1901 to 320,000 tons in 1926. The Shenango district on the other hand showed a slight drop, from 120,000 tons a month in 1901 to 115,000 tons 25 years later. Central and Northern Ohio advanced from 95,000 tons to 285,000 tons, Southern Ohio from 24,000 to 52,000 tons and the Wheeling district from 87,000 tons to 100,000 tons.

Declines were recorded in the Maryland-Virginia-Kentucky district and in the Tennessee district, which were more than offset by a large advance in the Alabama district. In Maryland, Virginia and Kentucky, the drop was from 70,000 tons a month to 62,000 tons, while in Tennessee it was from 38,000 tons to 12,000 tons. In Alabama, however, there was an advance from 115,000 tons to 220,000 tons within the quarter century.

Lastly the Chicago or Illinois-Indiana district showed a heavy gain, while the Western district showed a gain which was more moderate. Because of the substantial increases in capacity in those districts in recent years, and the corresponding great change in the direction of the production curve, these analyses started with 1908 instead of 1901. Another reason for the new base was the fact that in years preceding 1908 a number of other Western States, with smaller production, had been grouped in the monthly statistical figures with the output of Illinois. It was the development in northwestern Indiana, notably of the Inland Steel Co., and the plant at Gary, which caused the change. In the Illinois-Indiana district the advance was from 260,000 tons a month to 510,000 tons, or practically double, while in the far Western district the line went from 63,000 tons to 115,000 tons a month.

Forecasting conditions in the industry are based on the price of iron and steel scrap, unfilled orders of the United States Steel Corporation, fluctuations in coke production, net earnings of the Steel Corporation, and

a study of the demand for iron and steel. The latter is divided into demand from railroads, building construction, automotive industries, petroleum and mining and machinery. It is concluded that "the forecasting problem in the iron and steel industry is reduced to the use and interpretation of certain series arising within the industry itself. The principal series of this sort are the unfilled orders, the prices of the principal intermediate and final products of the industry, and the prices of the stocks of the great steel-producing corporations. The uses and limitations of such statistics in the formulation of a forecast in the outlook of the industry have been indicated in the several preceding chapters."

All in all, the book represents a vast amount of statistical analysis, aided by the use of diagrams. Many of the latter are comparative, showing two or more lines and thus indicating the relations between the two or more sets of data studied. As a contribution to the subject of forecasting by means of statistical analysis, the work will fill a large rôle, and should form the basis for further studies along particular lines.

S. G. K.

Steam Turbines. By Prof. Guiseppe Beluzzo, translated by A. G. Bremner, Captain of Engineers. Pages, 746, 6 x 8½ in.; text illustrations, 716; plates 2, folding illustrations, 34. Published by J. B. Lippincott & Co., Philadelphia. Price, \$14.

This most instructive addition to turbine literature is about the only one fit to stand in line with Stodola's standard work.

The general division of the 42 chapters of the work is in five parts; the thermodynamics and the calculations of steam turbines, their construction, and their application to marine engines and locomotives respectively.

A very desirable introduction to the efficient study of the work is a summary of the symbols most frequently employed therein; followed by conversion tables for British and metric dimensions, temperatures, etc. To further the reader's convenience, all through the volume all quantities are given in both kinds together. Numerous tables throughout the text obviate the necessity of referring to one's engineer's pocketbook or other work; and there are copious problems and examples, with clear solutions.

Considered as a translation, the book is somewhat awkward, bearing the marks of not having been written in English, originally. The diagrams are furnished with reference letters in German *Rundschrift*, and when in addition many of the letters, especially the *i*'s, are defectively rendered in photo-engraving, the reader is hampered from the beginning. This would lead to the idea that the Italian author had used diagrams from a German work. The absence of legends under the diagrams is also regrettable.

The very free use of Mollier's diagram of the phenomena that take place in steam turbines—perhaps the most useful of all diagrams used in this connection—is of advantage; and the comparison of the three diagrams, the *pv*, the entropy, and Mollier's, is most instructive. The statement (page 27) about the changes due to wire-drawing should be limited; as in many cases wire-drawing increases the steam temperature.

The transformations in the steam passing through the turbine—where heat is added either with or without pressure alteration—are considered diagrammatically and otherwise. The distinction between steam being at the same pressure before and after leaving the blades, and where it enters at a given pressure, discharging with a certain velocity into a space at the same pressure, (page 35) is not very clear.

Naturally, we expect free use of the calculus; but one familiar with diagram reading can get along very well without this branch of mathematics. Entropy is handled much better than in most text books.

The chapter on steam flow through all sorts of blades and channels, straight and curved, is most enjoyable and useful. To the phenomena of shock in steam flow, concerning which not sufficient is known and practised by engineers, considerable attention is paid in Chapter VI. The behavior of steam in guide passages at rest and in motion is well handled, numer-

ous concrete examples being given. The value of the term meaning "thermo-dynamic efficiency," although not given in the summary of symbols, being greater where the loss of kinetic energy in the nozzle is less and the passages between the rotor blades are small, it is necessary to know the best form for the passages and for the blades forming them. Chapter XI takes good care of this. Fig. 124 shows the steam flow in two of the three guide-passage types photographed by Samuelson.

The author makes a parallel between the steam and the hydraulic turbine, since the drop in calories, therefore of steam pressure, is equivalent for every kilogram to the drop in meters, as shown in Section 4 of Chapter V.

Chapter XIX on mechanical efficiency uses freely the experiments of Lewicki, Stodola, and Lasche, the author himself and others; while Chapter XX considers volumetric efficiency, particularly of the single elements and couples of a compound machine. This leads to Chapter XXI, on the total efficiency and consumption of steam.

Next we have that most important matter, partial steam admission, for both impulse and reaction turbines and also for combinations. (Happily the reference letters to the illustrations commence to be more legible.)

Part III, on construction, is of special importance in Chapter XXV relating to nozzles and blades; while disks, drums and shafts are taken up further on. Then come the casing, the external glands, and the bearings.

Both direct-coupled and geared marine turbines are described and illustrated freely.

As the material concerning turbine locomotives is thus far so meager, we cannot expect much under this head from Part V. Although the heat rejected to the condenser received attention on pages 252 and 282, that most important adjunct to American steam turbines, the booster, gets no mention.

An excellent alphabetical index adds to the value of this contribution to steam turbine literature—in fact, to that of hydraulic turbines also.

ROBERT GRIMSHAW.

"Bread and Fire," a novel of industry by Charles Rumford Walker, author of "Steel," (Houghton Mifflin Co., New York, \$2.50) gives two pen pictures of the industrial situation, and vague or cloudy though the pictures are, the reader is led on by the interest of the narrative in the hope that clearness and vividness may finally come. The glimpses are good of the activities of those self-appointed ardent social workers who think they know what is wrong in industry and would correct it over night by edict. Crammed in together in inadequate office quarters amid a jargon of socialistic, communistic, bolshevik and shades of belief up and down the scale, they appear as unbalanced as the rest of us, smug and unpoisoned, have believed them to be. The author's introductions to these characters are not calculated to increase our regard for amateur industrialists, who without direct practical experience, are sure they know how to deal with the labor problem. The second picture is in a non-ferrous rolling mill and is a drab visioning of hectic repetitive work done in contact with brutes and brawn. It is repulsive without being either clear cut or convincing as typical. If the book is to be regarded as a problem novel, the author would seem to suggest needs of investigating conditions rather than of offering cures.

"Steel Never Fails" is the title of a handsomely illustrated booklet recently issued by the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York. The title of the booklet is justified by 14 reasons outlined therein which are briefly summarized as follows: strength, safety, speed in construction, conservation of space, incombustibility, permanency, elasticity, ease of alteration, uniformity, adaptability to weather conditions, ability to stand abuse, minimum weight per strength of unit, high salvage value and responsibility of producing companies.

Directory of Testing Laboratories

For the convenience of those who wish to purchase materials under specification, the Bureau of Standards has compiled a list of testing laboratories equipped to examine the commodities tendered. In all there are 207 commercial testing firms and 143 college research laboratories.

The bureau has also inaugurated a so-called "certification plan" in accordance with which there are compiled lists of manufacturers who have expressed their desire to supply material complying with certain nationally recognized specifications and willing to certify to the purchaser that the material thus supplied is guaranteed to meet the requirements and tests of the specifications. This plan has already been applied to 48 government master specifications.

This "Directory of Commercial Testing and College Research Laboratories" may be obtained from the Superintendent of Documents for 15c.

Book on Coke and By-Products

A new coke publication, "Coke and By-Products in 1924," by F. G. Tryon and others, with a report on the "Marketing of Coal Products," by R. S. McBride, has been issued by the Bureau of Mines. Copies are being distributed to all producers of coke. Additional copies may be obtained at 25c. each from the Superintendent of Documents, Washington. The publication consists

New Books Received

Manual of Endurance of Metals Under Repeated Stress. By H. F. Moore. Pages 63, 5 x 7½ in., illustrated. Published by Engineering Foundation, 29 West Thirty-ninth Street, New York. Price, \$1.

Benjamin Garver Lamme. An autobiography. Pages 271, 6 x 8¼ in., illustrated. Published by G. P. Putnam's Sons, 2 West Forty-fifth Street, New York.

Metallurgy. By Henry Wysor. Pages 433, 6¼ x 9¼ in., illustrated. Published by Chemical Publishing Co., Easton, Pa. Price, \$6.

Tungsten. A treatise on its metallurgy, properties and applications. By Colin J. Smithells. Pages 167, 6 x 9½ in., illustrated. Published by D. Van Nostrand Co., 8 Warren Street, New York. Price, \$6.

★ **Organizing the Drafting Department.** By H. F. Church. Pages 133, 6 x 8¼ in., illustrated. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$3.50.

Vacations for Industrial Workers. By Charles M. Mills. Pages 328, 6 x 8½ in. Published by Ronald Press Co., 15 East Twenty-sixth Street, New York. Price, \$5.

Development and Present Position of Chemical Analysis by Emission Spectra. By F. Twyman. Pages 43, 6 x 9½ in., illustrated. Published by Adam Hilger, Ltd., 24 Rochester Place, London, N. W. 1, England. Price, 2s. 6d.

Inventions and Patents. By Milton Wright. Pages 225, 5¼ x 8¼ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$2.50.

Fatigue of Metals. By H. F. Moore and J. B. Kommers. Pages 326, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$4.

Care and Operation of Machine Tools. By J. W. Barritt. Pages 292, 6 x 9¼ in., illustrated. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. Price, \$2.75.

Personal Health. By Emery R. Hayhurst. Pages 279, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$3.

Laboratory Manual of Testing Materials. Third Edition. By William Hendrick Hatt and H. H. Scofield. Pages 182, 4¼ x 7¼ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Industrial Safety Organization for Executive and

of 137 pages, 16 diagrams and 90 statistical tables on the operations of the beehive and the by-product coke industry in 1924, supplementing the mimeographed summaries issued by the bureau in 1925. The report on the marketing of coal products by Mr. McBride is a discussion of economic and technical factors in the disposal of primary products of coal carbonization. It treats of the inter-relations of the beehive coke, by-product, and city gas industries, and of the uses, consumption and sale of coke, gas, tar and tar products, ammonia and light oils.

Automobile Facts and Figures

Data in great profusion regarding the automobile industry and allied work are covered in the 1927 edition of "Facts and Figures of the Automobile Industry," issued by the National Automobile Chamber of Commerce, 366 Madison Avenue, New York, in a booklet of 96 pages. Diagrams, many of them in color, illustrate the text, while statistical tables abound. Particular attention is given this year to figures of buses and motor trucks, either competing with or acting in conjunction with railroads and trolley lines. Total registration of cars at the end of 1926 is given as 22,001,393, of which 19,237,171 represent passenger cars and 2,764,222 trucks. Wholesale value of the cars produced last year is given as \$2,730,385,507 for passenger cars and \$433,371,169 for trucks.

Engineer. By Lewis A. De Blois. Pages 328, 6 x 9 in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$4.

The Technique of Executive Control. Second Edition. By Erwin Haskell Schell. Pages 130, 4¼ x 7¼ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$1.75.

The Gasoline Automobile. Its Design and Construction. Vol. 1, seventh edition. By P. M. Heldt. Pages 728, 5½ x 8¼ in., illustrated. Published by P. M. Heldt, Nyack, N. Y.

The Practice of Lubrication. An Engineering Treatise on the Origin, Nature and Testing of Lubricants, Their Selection, Application and Use. Second Edition. By T. C. Thomsen. Pages 616, 6 x 9 in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$6.

American Machinists' Handbook. Fourth Edition. By Colvin and Stanley. Pages 972, 4¼ x 6¼ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$4.

The Mineral Industry. Its Statistics, Technology and Trade During 1925. Edited by G. A. Roush and Allison Butts. Pages 906, 6 x 9 in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$12.

Les Moteurs a Combustion. By Edmond Marcotte. Pages 217, 4½ x 6¼ in., illustrated. Published by Armand Colin, 103 Boulevard Saint-Michel, Paris. Price, 11 fr. 90.

Fundamentals of the Locomotive Machine Shop. Railwaymen's Handbook Series. By Frank M. A'Hearn. Pages 242, 4½ x 7½ in., illustrated. Published by Simmons-Boardman Publishing Co., 30 Church Street, New York. Price, \$2.50.

Van Nostrand's Chemical Annual. Sixth Issue, 1926. Edited by John C. Olsen and T. R. Le Compte. Pages 882, 5 x 7 in. Published by D. Van Nostrand Co., 8 Warren Street, New York. Price, \$5.

Proceedings of the Industrial Accident Prevention Conference, held at Washington, D. C., July 14 to 16, 1926. Pages 172, 6 x 9 in. Published by the Government Printing Office, Washington.

Interstate Commerce Commission Fortieth Annual Report. 1926. Pages 306, 5½ x 9 in. Published by Government Printing Office, Washington, D. C.

Wärmewirtschaft im Eisenhüttenwesen. Vol. 3. By A. Naegel and W. Pauer. Pages 125, 6 x 8¼ in., illustrated. Published by Theodor Steinkopff, Leipzig, Germany.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

STEEL production continues slightly above normal, taking into account seasonal conditions, June having shown about double the usual seasonal decline.

Finished steel prices, with production nearly down to normal and with unfilled orders at bottom levels, should show some advance in the autumn.

Pig iron production, still heavily above nor-

mal, showed some of the needed curtailment in June, and more is likely to follow.

It seems apparent that the pig iron market is now close to bottom price levels.

Scrap and coke prices are near bottom, but all items of rolled steel are too low by comparison with their raw materials. Steel prices are likely to advance in the fall.

TWO facts stand out clearly among the steel statistics: ingot output was sharply curtailed in June, and in the same month there was an unexpected gain in the unfilled orders of the Steel Corporation. The two are not unrelated, but the more significant is undoubtedly the curtailment of production.

Ingot Production Close to Normal

JUNE output of approximately 3,466,000 tons compares with 4,015,000 tons in May. The June figure is only 3.7 per cent above our estimate of normal and compares with an excess above normal of 12.3 per cent in May. Usually there is a decrease in the production of steel ingots in June, which has averaged about 6 per cent over a long series of years, and a decline of that amount may be considered purely seasonal. Actually the decrease last month was 13.7 per cent and it therefore means a real curtailment and one which is much as we have forecast.

Incidentally, the P-V Line appears to be vindicated as a steel barometer. Production is getting down close to normal and if in 1927 the bottom is reached during July, as was the case in 1921 and again in 1924 (note the three-year intervals), the ingot output will fall to

or below 3,117,000 tons, the figure which we estimate as normal for July. A decline of at least this much seems probable.

As to the unfilled orders, while we think the significance of the increase may be exaggerated, it is not without its importance. The Steel Corporation usually and normally has shown a decline in unfilled orders in June, and the rise last month, even though small, is significant because it is contrary to the normal trend. This is the first time since 1922 that our adjusted curve of unfilled orders has risen in June. The fact may well mark the beginning of the turn for the better which we have forecast for autumn.

Little New Business Indicated

But at most it can be but an early symptom. In the first place, it does not appear to represent the condition of the steel makers as a whole. In the second place, it was chiefly due to a decline in production and shipments. So small a gain in unfilled orders, in spite of so large a decline in output, certainly indicates little addition to new business. It continues true that 3,053,000 tons constitutes a small backlog indeed—smaller even than in July, 1924—and that forward buying must pick up so as to cause an increase of

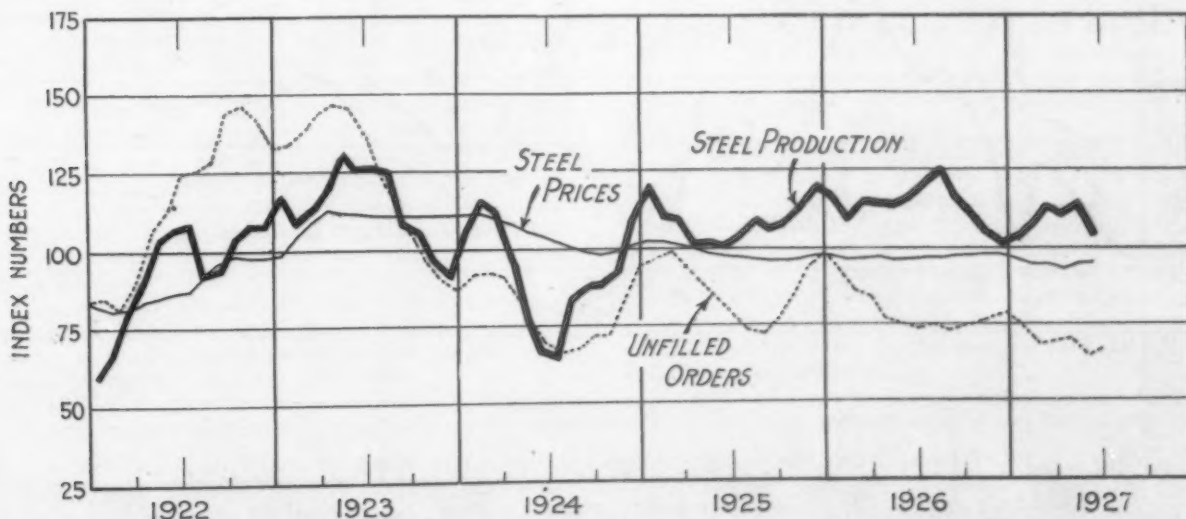


Fig. 1—Ingot Production Fell Off in June About Twice the Usual Amount, Placing the Adjusted Curve at Close to Normal. Unfilled orders showed a small advance. Prices of finished steel, while slightly higher, continue close to their lowest level since 1922

1.6 per cent in the unfilled orders at the end of July if the Corporation is to show even the usual seasonal gain in unfilled orders.

THE IRON AGE composite price of finished steel averaged 2.369c. in June, against 2.365c. in May, and 2.420c. a year ago. Thus there has been a slight rise in the monthly average in each of the last two months, due chiefly to higher prices on sheets, the quotations for which article are now nearly back to a normal position in the price structure. With production nearly down to normal and still declining, and with unfilled orders at bottom levels, it seems that steel markets should firm up before long and show some advance in the autumn.

Slower Movement Expected in Pig Iron

PIG iron markets seem likely to be slower in gaining in strength than in the case of steel, partly because the production of pig iron requires greater curtailment than in the case of steel if the supply and demand factors are to be brought into a sound balance. Like ingots, pig iron production was curtailed rather sharply in June. But it is still about 11 per cent above our estimate of normal and must be above any reasonable estimate of the normal requirements of the country. Our adjusted index for June is 111, which compares with 117.5 in May and 117.3 in June, 1926. The June pig iron production represents about the same annual rate as existed in February.

It will be noted that this considerable excess above normal exists in spite of the fact that the percentage of blast furnaces active has fallen well below the 60 per cent level during the last two months, showing that the average capacity of the furnaces active is greater than it used to be.

It is important to consider the ratio of pig iron production to steel production. The fact that the output of pig iron is so much out of line with ingot production confirms the excess of the former and makes it more significant than it would otherwise be. It is not so badly out of line as in the spring and early summer of 1924, but the situation is nearly as unbalanced as it was in April, 1925.

Stocks Probably Not Heavy

Both of these earlier periods of maladjustment introduced sharp downward trends in the iron output. But both also were followed in two or three months by rising pig iron prices. Furthermore, the stocks of merchant pig iron are probably not so heavy as in the

periods mentioned and it may be inferred that the amount of curtailment required at present is not so great as then. Probably another drop in the pig iron output in July of about 300,000 tons, which would mean a total of around 2,700,000 tons, would be adequate to bring the market into a position where equilibrium would soon be restored.

THE IRON AGE pig iron composite price averaged \$18.93 in June against \$19.09 in May and \$19.82 a year ago. This is the lowest monthly average since March, 1922, though recent declines have brought the index down to \$18.59 and weakness is still evident in the pig iron market. Our judgment is that the price is now very close to bottom and that the market awaits only another dose or two of the good old remedy of production curtailment to bring recovery, and that the patient will show convalescence by September at the latest.

Steel Too Low in Comparison

MALADJUSTMENT in the iron and steel price structure appears to be approaching a crisis. Two sharply defined divisions exist, within each of which the adjustment is nearly normal, but between which there is a lack of adjustment that is so great that it cannot long endure. On the one hand, what we may call the raw materials, namely, coke, scrap and pig iron, show a fairly normal price relationship, though scrap is perhaps a little higher than normal in comparison with the other two. On the other hand, a group of finished products such as bars, nails and sheets, also show a normal relationship among themselves, with sheets perhaps a little lower than is desirable.

Between these two groups, however, the maladjustment is pronounced. Take billets as a base: Compared with billets, finished steel prices average too low, while at the same time raw material prices average too high. Of course, this means that the spread between the raw materials and finished steel is decidedly small. Certainly the situation as to billet prices is difficult to analyze. Semi-finished material appears too high in comparison with finished steel, at the same time that it is considerably too low in comparison with raw materials.

One might well conclude either that finished steel must advance or that raw materials must decline. On the basis of present raw material prices, a normal price structure would indicate something like 2.3c. for bars, over 3c. for nails and at least 3.8c. for black sheets. Or, if we assume the present level of finished steel

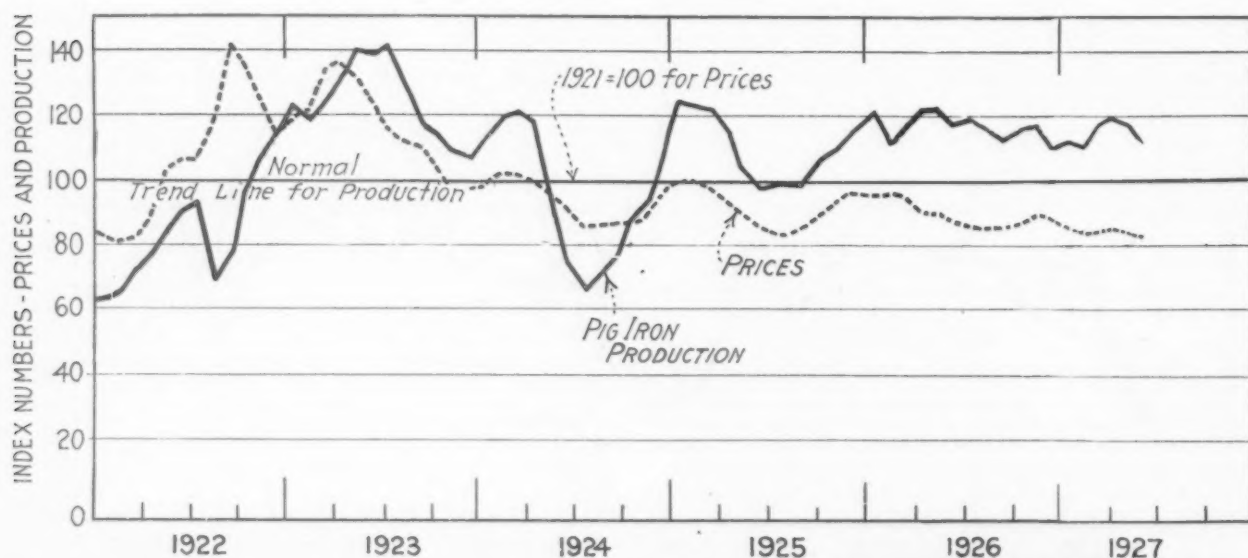


Fig. 2—Pig Iron Production, While Still High in Relation to Steel, Showed in June Some of the Expected Curtailment. A further drop is probable. The price is the lowest since 1922, but appears now to be close to bottom

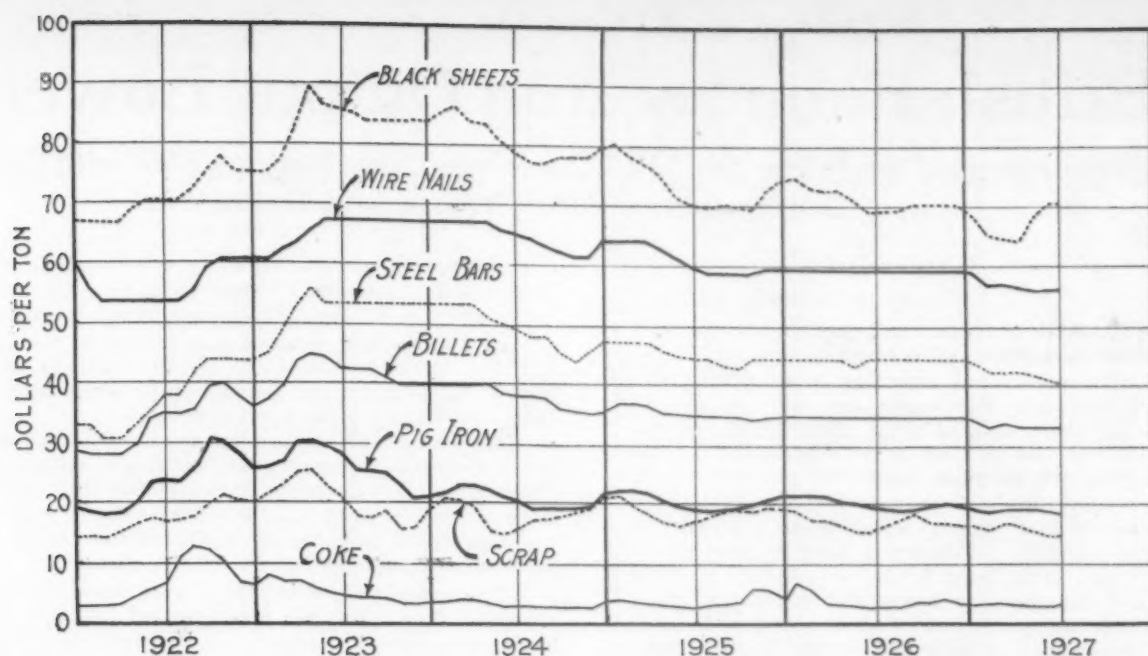


Fig. 3—Finished Steel Prices are Low with Regard to Semi-Finished and Raw Materials. While the price structure depicted above is badly out of adjustment, some portions of it are in accord with each other. The relation of pig iron to scrap and coke may be about normal, and sheets, nails and bars are in fair relation, though too low as a group

prices, pig iron should sell at around \$13.50, scrap at about \$10, and coke would be nearly free!

Condition Similar to Early 1925

The situation perhaps finds its closest analogy with the early part of 1925. Then the price spreads were quite similar except that scrap was relatively higher, while sheets were a little lower. Nails, too, were in a little stronger position. The raw materials at that time appeared to be too high in comparison with billets, though not so much so as at present.

As in the case of 1925, we think that a readjust-

ment will be effected this fall and that it cannot be worked out through much further reduction in the prices of scrap and pig iron. Pig iron and scrap are nearly at bottom levels and we venture to forecast a little higher level of prices for those commodities by September. In view of the curtailment in production, billets, which could not stand much advance in the raw materials anyhow, should rise in price. Thus the whole structure may be raised. Billets, for example, would seem reasonably priced if they were to reach \$36 toward the end of the year, and the same might be said of bars at 2.2c.

IMPORT RATES CANCELED

Commission Prescribes Maximum Rates on Foreign Steel Moving from Texas Ports

WASHINGTON, July 19.—Schedules filed by railroads providing new rates on iron and steel products imported through Gulf ports, in purported compliance with a decision of the Interstate Commerce Commission, were ordered canceled in a report made public by the commission last Saturday, and a specific basis of rates was prescribed. The commission ordered cancellation of the proposed tariffs on or before Aug. 12 and the filing of new schedules on statutory, or 30 days' notice, naming the rates found reasonable. The carriers had sought to cancel the rate of 41.5c. per 100 lb. on "special iron and steel," which includes a long list of merchant products, applying from Texas Gulf ports to St. Louis and to Little Rock and Pine Bluff, Ark., and to restrict the import class rates so that the fifth-class rates would not apply on that traffic, thus providing for the application of domestic rates on practically all iron and steel articles imported through Texas ports.

The commission, however, found that reasonable maximum rates per 100 lb. from Houston, Galveston, Texas City and suburbs to destinations in Oklahoma, Arkansas and Missouri are as follows:

To points in Oklahoma and Arkansas not more than approximately 475 miles from Houston, 53c.

To points in Oklahoma, Arkansas and Kansas more than approximately 475 miles, but not more than approximately 600 miles, from Houston, 61c.

To points in Kansas, Missouri and Arkansas more than approximately 600 miles, but not more than approximately 750 miles, from Houston, 69c.

To St. Louis, 74c.

In all these cases a 3c. terminal charge at the ports is to be added.

From Texas points other than indicated in the foregoing the commission held that reasonable maximum rates will be rates found in Column 32½ in Appendix 13, Consolidated Southwestern cases, plus the terminal charge of 3c. In the latter case, the commission prescribed differentials, beginning with 11c. per 100 lb. over the first class rate, with an ascending scale dependent upon the mileage.

The commission also granted fourth section, or long-and-short haul, relief to the Rock Island Railroad. By reason of this the Rock Island and interested connections can establish the same rates on imported iron and steel articles in carloads from Galveston and Houston to Amarillo, Tex., over their route through Oklahoma as are in effect on like traffic over the direct lines from the same ports to Amarillo. At the same time they can establish higher rates to stations in Oklahoma on the bases found reasonable.

Schedule of the next installments of the *Business Analysis and Forecast*, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows: July 28—General Business Outlook; Aug. 11—Activity in Steel Consuming Industries; Aug. 18—Position of Iron and Steel Producers.

British Foundry Iron Output Lower

Hematite Exported but Prices Are Soft—Committee Urges Marking Steel with Country of Origin—Germany May Reduce Steel Duties

(By Cable)

LONDON, ENGLAND, July 18.

CLEVELAND producers have banked two furnaces in order to curtail the output, as demand continues poor. Consumers are expecting lower prices but although fuel costs and wages are lower, makers state that they are unable to grant further concessions.

Hematite iron is more active, particularly for export to Holland and Belgium, but prices are weak as there is keen competition. Foreign ore is inactive.

Finished steel is quiet generally as a result of the Scottish holiday. A few works have secured moderate sized orders from India but export to other markets is dull and domestic consumers are purchasing only for immediate needs. Prices continue unchanged.

June exports of pig iron totaled 22,300 tons, of which only 45 tons went to the United States. Exports of all kinds of iron and steel totaled 366,000 tons.

Tin plate is quiet and makers are beginning to view their position as serious. More mills have closed and consumers are buying only immediate requirements.

Galvanized sheet demand has improved for small lots, but substantial business is still lacking. Black sheets, No. 24 gage, are easier, but Japanese specifications are unchanged with demand light.

Continental markets are quiet. British consumers are disinterested generally but Continental mills report slightly improved demand for export although the tonnage involved is small. Makers are anxious for orders but concessions are not generally offered except on favorable specifications.

The Government committee formed under the Merchandise Marks Act has recommended marking with the country of origin imports of iron and steel plates, sheets, flats, hoops, strip steel, rails, beams, channels and bars, round, square and hexagon.

British Pig Iron Dull—Ship Plates Quiet

LONDON, ENGLAND, July 8.—The annual holiday periods in the iron and steel industry are now approaching, and a quiet tone is expected to prevail for some weeks. The Glasgow Fair holiday begins in a few days and after that the Northeastern works will begin their vacation. Meanwhile, there have been no important developments in the industry as a whole. Consumers of British pig iron have not purchased except to cover immediate requirements and the stocks on makers' yards have been accumulating. However, there are still considerable quantities of iron to be absorbed, chiefly by Scottish users.

Some blast furnaces have been banked and others have been transferred to grades other than foundry, but still the output is in excess of the requirements and it seems likely that additional furnaces will be blown out unless the demand improves. Hematite producers are a little better placed than foundry furnaces, as they are in a position to compete with Continental

iron in foreign markets and some moderate tonnages have been sold, principally to Italy.

In the semi-finished material, the chief business moving is in continental blooms, billets and sheet bars, these being obtainable at much lower prices than are quoted by British makers. With rolling mills quiet, however, the demand for supplies of semi-finished material has lessened appreciably and it is reported that some foreign plants need orders for early shipment.

In finished products the least activity is in heavy plate material. For some months the plate mills have been busy on contracts for shipyards and deliveries of this material, in most cases, have been completed. The shipyards have sufficient material for their present work and while several new shipbuilding contracts have been placed, the steel for them has not yet been bought.

Structural and rail mills are fairly busy and in some cases makers are behind in deliveries. The Continent continues a strong competitor, but owing to the fluctuating nature of Continental prices, consumers are inclined to purchase as little as possible.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd.	£0 19½s.	\$4.72
Bilbao Rubio ore†	1 1½	5.21
Cleveland No. 1 fdy.	3 12½	17.57*
Cleveland No. 3 fdy.	3 10	16.97*
Cleveland No. 4 fdy.	3 9	16.73*
Cleveland No. 4 forge	3 8½	16.61*
Cleveland basic	3 15 to £3 15½s.	18.18 to \$18.30
East Coast mixed	3 16 to 3 16½	18.42 to 18.54
East Coast hematite	3 17½	18.79
Rails, 60 lb. and up.	7 15 to 8 5	37.58 to 40.01
Billets	7 5 to 7 10	35.16 to 36.37
Ferromanganese	12 0	58.20
Ferromanganese (export)	10 15 to 11 0	52.13 to 53.35
Sheet and tin plate bars, Welsh	6 5	30.31
Tin plate, base box	0 18½ to 0 18¾	4.48 to 4.54
Black sheets, Japanese specifications.	13 15	66.68
C. per Lb.		
Ship plates	7 12½ to 8 0	1.65 to 1.73
Boiler plates	10 10 to 11 0	2.27 to 2.38
Tees	8 2½ to 8 12½	1.75 to 1.87
Channels	7 7½ to 7 17½	1.60 to 1.70
Beams	7 2½ to 7 12½	1.54 to 1.65
Round bars, ¾ to 3 in.	7 12½ to 8 2½	1.65 to 1.75
Steel hoops	10 10 to 11 0	2.28 to 2.39
Black sheets, 24 gage	10 5	2.22
Galv. sheets, 24 gage	14 0	3.03
Cold rolled steel strip, 20 gage, nom.	14 0	3.03

*Export price, 6d. (12c.) per ton higher.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron: (a)			
Belgium	£3 2s.		\$15.03
France	3 2		15.03
Luxemburg	3 2		15.03
Basic pig iron:			
Belgium	3 1		14.79
France	3 1		14.79
Luxemburg	3 1		14.79
Coke	0 18		4.37
Billets:			
Belgium	4 6	to £4 8s.	20.85 to \$21.33
France	4 6	to 4 8	20.85 to 21.33
Merchant bars:			
Belgium	4 13		1.02
France	4 13		1.02
Luxemburg	4 13		1.02
Joists (beams):			
Belgium	4 14		1.03
France	4 14		1.03
Luxemburg	4 14		1.03
Angles:			
Belgium	4 15		1.04
¼-in. plates:			
Belgium (nominal)	6 5		1.37
Germany (nominal)	6 5		1.37
¾-in. ship plates:			
Belgium	6 0		1.32
Luxemburg	6 0		1.32
Sheets, heavy:			
Belgium	6 1		1.33
Germany	6 1		1.33

(a) Nominal.

GERMAN MARKET STILL ACTIVE

Buying Expected to Continue Through Next Quarter—Consumers Seek Lower Prices

BERLIN, GERMANY, July 4.—Domestic prices for iron and steel continue unchanged for July, but export prices following a slight tendency to rise in June are again weak. Domestic iron ore prices show no change. Blast furnaces and steel plants are operating at capacity and many companies, particularly producers of semi-finished material, are temporarily out of the market. Delivery terms vary from two to four months and the tendency is to lengthen rather than grow shorter.

Both domestic and export business in pig iron is quiet but since the middle of June there has been increased activity in rolling mill products, particularly in structural material and sheets for shipyards. While the increase in demand for bars and bands continues, activity in wire rods has slightly declined. During June foreign demand for rolled products declined but producers as a whole still manifest but little interest in export business.

Orders for railroad car construction and railroad permanent way material are increasing and manufacturers in many cases have sufficient business to carry them for several months. Locomotive builders also report improvement.

Continued Activity Expected

In some quarters it is believed that the present activity will continue for at least three to four months more, but there are signs that the volume of demand is not mounting so rapidly as a few weeks ago. No change has been made in the bounties to exporting manufacturers for July. Current domestic prices, f. o. b. works, are: Billets 112.50 m. (\$26.70) per metric ton; blooms, 105 m. (\$24.93); bars 134 m. (\$31.81); shapes 131 m. (\$31.10); bands 154 m. (\$36.55); wire rods 139.30 m. (\$33.07) per ton.

Recently a number of German producers of sheets approached Czechoslovakian rolling mills with the suggestion of a price agreement, but the Czechoslovakian mills objected to negotiating until a German thin sheet syndicate had been formed. Efforts to establish such a syndicate in Germany have been unsuccessful and have been temporarily abandoned.

No material progress has been made toward formation of international selling syndicates as subsidiaries of the International Steel Cartel and meanwhile the cartel is exercising but little effect on prices. Negotiations are understood to be under way for the

inclusion of Great Britain in the European Tube Syndicate. Plans for the formation of an international pig iron syndicate are delayed by the failure of the western European producers to agree upon a satisfactory division of the foundry iron export markets.

The Polish Steel Syndicate claims that no differences as to quotas stand in the way of Polish entry into the International Steel Cartel and denies that it has made membership dependent upon an agreement covering export to the eastern European countries, such as Czechoslovakia, Austria and Hungary. It is claimed that an agreement with these countries is worthless as long as Germany and other large members of the international cartel do not limit their activities in eastern Europe.

Rail Makers May Finance Foreign Projects

At the recent quarterly meeting of the European Rail Makers Association, held in London, in addition to advancing the export price on rails to £6 7s. 6d. (\$30.92) per ton, there was unofficial discussion of a plan for financing of railroad construction in undeveloped countries by the extension of credits. Current sales of the association are reported at 60 per cent of the pre-war total.

As a result of reorganization in the heavy industries and increased use of machinery and better technical methods, the output of coal, iron and steel companies has increased while the number of employees has declined. In general, however, the intense activity of recent months has caused increases in the number of employees although the per capita output is larger than formerly. A recent report of the Vereinigte Stahlwerke A. G. (United Steel Works), Duesseldorf, shows that the original member corporations, excluding the later acquisitions such as the Stumm, Rombach and Charlottenhuetten works, employ less workers today than a year ago, but have a considerably larger production. In April, 1926, the total of employees engaged in the production of pig iron and steel was 76,653 and the output was 311,600 metric tons of pig iron and 344,500 tons of steel. In March, 1927, the total of workers had dropped to 76,393 and the output was 547,600 tons of pig iron and 615,700 tons of steel.

It is pointed out that in this period of increased output per capita wages in the Ruhr have advanced only about 4 per cent and this is used by consumers as an argument for reduction of the iron and steel schedule of the tariff. The steel producers, however, claim that wages are still too high. It is pointed out that the average skilled worker in the metal working industries in April earned 48.10 m. (\$11.42) per week and unskilled workers earned 33.16 m. (\$7.87) per week.

GERMANY MAY LOWER TARIFF

Government Proposal to Reduce Duties Opposed by Steel Industry

BERLIN, GERMANY, July 4.—The Government's declarations in favor of the lower tariff recommendations made by the Geneva Economic Conference have been rather unexpectedly followed by action. The Federal Economic Council is to be requested to prepare immediately a tariff revision plan "with the aim of reduction of duties." This means only reduction of industrial duties. The Minister for Industry has pointed out that, while industrial duties are too high, in some cases even constituting "super-protection," food duties are low and only imperfectly protect agriculture. It is understood that three items on the food schedule of the tariff are to be slightly increased.

This revision of duties will be somewhat delayed as it will be applied to the new general tariff, which is in preparation. Meanwhile the temporary minor tariff now in effect will be prolonged until Dec. 31, 1929. It is understood that the amount of the reductions to be made in the new tariff will depend upon the extent to which other countries act upon the Geneva conference recommendations.

Evidently, with the exception of the machinery builders, practically all leading German industries will

oppose the plans for reduction in duties. The machinery builders see no prospect of competition within Germany and would gain by a decrease in the duties on iron and steel. This branch of industry has already made a qualified declaration in support of the new policy of reduced duties. The iron and steel industry in opposing reductions in the tariff claims that it is only by charging higher prices in the domestic market that export trade can be retained at the present unprofitable price level.

Opposition is also appearing from the automobile manufacturers, who are dissatisfied with the present tariff, which is automatically reduced every six months, from July 1, 1926 to July 1, 1928. The original duty on cars weighing up to 22 double centners (4846 lb.) was 250 m. per double centners, but by July, 1928, by progressive reduction of the duty, it will be only 75 m. per double centner. The assumption was that by 1928 mass production and standardization would enable German manufacturers to meet the competition of the foreign product. On the contrary imports have recently increased, although this is explained in part by the inability of German manufacturers to supply the domestic demand for automobiles.

On the whole the prospects of successful tariff reduction are not considered very good and the Reichsrat has already rejected several proposed changes in the duties on food projects.

Fuel Economy and More Canals for Belgium

BRUSSELS, BELGIUM, July 7.—The iron and steel markets continue weak with prices in many cases almost at the low March level, lowest point of the year. In most cases quotations are nominal, rolling mills particularly being willing to make concessions to secure tonnage. The offering of concessions is also evident in wire rods, formation of the International Wire Rod Syndicate not having served to strengthen the market.

Recently the National Committee for Industrial Production made suggestions to producers with the intention of aiding in the reduction of production costs. Among various suggestions made were several applying to fuel economy. It is pointed out that whereas Belgium had an export surplus of coal in 1910, there is now heavy importation, the total imports in 1925 being 7,714,000 metric tons. More hydroelectric power from the unused rivers is urged and further canal construction to provide cheaper transportation is proposed. It is estimated that further canal construction would reduce transportation costs between Liege and Antwerp by as much as 40 per cent. General fuel economy, it is estimated, should save up to 10,000,000 tons of coal annually.

Court Grants Liquidation of Dominion Steel Corporation

Application by the National Trust Co., Ltd., for winding up the affairs of the Dominion Steel Corporation, Ltd., Montreal, was granted on July 12 by a decision handed down by the Supreme Court of Nova Scotia. The petition was filed on March 26 and asked for the appointment of the Royal Trust Co., as liquidator of the corporation, which is a subsidiary of the British Empire Steel Corporation, Ltd. A previous application for a similar move in connection with the British Empire company was dismissed on April 18. On July 11 second preferred stockholders of the parent company brought about the defeat of a plan introduced by President R. M. Wolvin for the reorganization of the company. The recent decision, it was announced, will be appealed.

Empire Mining and Metallurgical Congress Meets in Canada Next Month

Three years ago the British Institution of Mining Engineers, a federation of seven provincial institutes representing coal mining engineers, the British Institution of Mining and Metallurgy, and the British Iron and Steel Institute united in sponsoring the "Empire Mining and Metallurgical Congress" in London. This proved to be such a success that it was determined to meet again in 1927.

Canada is to be the host for the coming meeting. Under the active direction of I. L. Agnew, (president of the Canadian Institute of Mining and Metallurgy, and of the International Nickel Co. of Canada), a program has been arranged which has brought forth a good advance registration from all parts of the British Empire, and from the United States.

Special steamers and trains will convey the parties. One tour will take a group across the continent to the Pacific Coast, whereas another group will journey to Newfoundland and the other maritime provinces. Many side trips to interesting manufacturing centers and mining regions are being planned for the men, as well as a round of social functions for their ladies.

Discussions interesting to producers and consumers of iron and steel products will be held in Montreal, Aug. 22 and 23; Toronto, Aug. 25 and 26 and Sydney, Sept. 9 and 10. At Winnipeg, Sept. 3 and in Quebec, Sept. 5 and 6 will be held meetings on gold mining problems. At Vancouver, Sept. 14, the British Columbian copper, lead and zinc industry will take charge, while at Edmonton, Sept. 20 the coal and petroleum situation will receive attention. R. O. Wheatley, associate secretary, 627 Drummond Building, Montreal, P. Q., Canada, is in charge of details.

Italy Importing More Agricultural Machinery

ROME, ITALY, June 28.—According to recent statistics, imports of agricultural machinery are rapidly increasing. Comparisons on a tonnage basis show that whereas importations totaled 8896 tons in 1924, there were imports of 13,739 tons in 1925 and 21,575 tons in 1926. During the first quarter of 1927 agricultural machinery imported totaled 6000 tons. In 1926 Germany ranked first among the sellers to Italy, furnishing 54 per cent. of the Italian imports of agricultural machinery compared with only 41 per cent of the total in 1924. The United States was second, furnishing 18 per cent of the total compared with 16 per cent in 1924, and Great Britain was third, with 13 per cent. of the total, compared with 21 per cent. of the 1924 imports. Czechoslovakia and Austria provided small percentages.

Russian Buyers Not Satisfied with Home Product

HAMBURG, GERMANY, July 2.—A newspaper in Moscow recently sent out a questionnaire to Russian buyers of machinery to discover how well satisfied consumers were with the operation of the State machinery and electrotechnical combination. From the replies, which were published without comment, it appears that the quality of machinery produced is not considered good, as in most cases after short operation extensive repairs and replacements are necessary.

From the replies to the questionnaire it also appears that deliveries have been exceedingly unsatisfactory and prices are considered exorbitant. In some cases delivery delays have been of more than a year. A textile works claims that the same type of ½ h.p. electric motor purchased in Russia at about \$81 was offered by a German maker at \$19 and there were other replies showing a similar difference in Russian and foreign prices.

European Ferrosilicon Makers Seek to Hold Prices

HAMBURG, GERMANY, June 27.—European prices on ferrosilicon during recent months have been below the 1913 quotations, according to a report of the European Ferrosilicon Syndicate. Costs of production and raw materials, however, are considerably higher. To avoid serious financial losses to producers a verbal agreement has been made, which is expected to maintain prices although no penalties for underselling have been fixed. Under the agreement prices only show slight advances, which makers claim are necessary to prevent losses.

Much of the recent severe competition seems to be the result of increased productive capacity during the war and today most producers are only operating at from 40 to 50 per cent of capacity. French and Italian producers are not included in the agreement as they are quoting high prices for their own domestic markets and apparently are not interested in seeking export business.

Canadian National Plans Coast-to-Coast Improvements

WASHINGTON, July 19.—A program consisting of a coast-to-coast improvement of the Canadian National Railways, according to the industrial machinery division, Department of Commerce, proposes the laying of 100-lb. rails on 297 miles of the main line and the relaying of 421 miles with 85-lb. rails. Steel structures are to replace many wooden trestles. The automatic block system now extending 38 miles west of Montreal will be carried an additional 17 miles. New stations will be built at Edmonton, Alta., and Jonquiere, Que. Track extensions in the estimate for the year's program include general yard work and a new engine terminal at Windsor, Ont.

JUNE SHEET ACTIVITY

Sales Up but Production and Shipments Down from May

PITTSBURGH, July 18.—Statistics of the independent sheet steel producers show, as indicated below, that sales in June, 1927, increased over those of May, but shipments declined.

	1927			June, 1926
	June	May	April	
Total number of mills	712	712	712	710
Capacity per month	433,700	433,700	421,330	432,650
Percentage reporting	72.3	72.3	72.3	73.8
Sales	224,321	212,337	292,965	284,319
Production	300,706	309,360	316,100	266,448
Shipments	281,395	302,759	300,858	262,231
Unfilled orders	399,562	439,067	491,290	422,237
Unshipped orders	120,295	128,316	123,076	121,288
Unsold stock	47,860	45,670	46,901	55,140
Percentage of Capacity				
Sales	71.6	67.7	95.6	89.0
Production	95.9	98.7	103.1	84.0
Shipments	89.7	96.6	98.1	82.1
Unfilled orders	127.4	140.0	160.2	132.2
Unshipped orders	38.4	40.9	40.1	38.0
Unsold stock	15.3	14.6	15.3	17.3

Machine Tool Builders to Work for Better Castings

CINCINNATI, July 19.—The need for better castings in the machine tool industry is shown as the result of a recent survey conducted by the National Machine Tool Builders' Association. Interest in this matter was stimulated by the recent discussions at the Chicago convention of the American Foundrymen's Association. E. F. DuBrul, manager, states that an effort will be made immediately to get at the problem through a series of regional conferences between machine tool manufacturers and their foundrymen. It is hoped that at these sessions ways and means for increasing the quality of castings will be developed.

Will Reduce Manganese Ore in Montana

The Domestic Manganese & Development Co., Butte, Mont., has leased the Butte reduction works of the Anaconda Copper Mining Co., 25 Broadway, New York, idle for more than 15 years past, and will remodel and equip for a new manganese ore reduction plant, with cost reported in excess of \$100,000. The company has arranged for a raw material supply from the Emma mine of the Butte Copper & Zinc Co.

Wheeler Condenser & Engineering Co. and Power Specialty Co. Merge

The Wheeler Condenser & Engineering Co., 149 Broadway, New York, and the Power Specialty Co., 111 Broadway, New York, have been consolidated, the new company to be known as the Foster-Wheeler Corporation. For some time there has been a close working arrangement between the companies and an interlocking of financial interests. The Wheeler company has plants at Carteret, N. J., and Newburgh, N. Y., and has been one of the largest manufacturers in the United States of condensers and other steam auxiliary equipment, while the Power Specialty Co. makes various types of steam generating equipment and oil refining equipment. Its main plant is at Dansville, N. Y., but it also has plants in Canada and England. The products of the two companies have been sold to the same customers, but there are no competing lines.

Combined assets of the two companies are said to be about \$12,000,000. The new capitalization will consist of 35,000 shares of no-par value \$7 cumulative preferred stock and an authorized issue of 300,000 shares of no-par value common stock, of which only 200,000 shares have been issued. A banking group headed by Edward B. Smith & Co. and Brown Brothers & Co., New York, have underwritten the preferred stock issue.

J. J. Brown, for eighteen years president of the Wheeler company, will become chairman of the board of the new corporation, while L. B. Nutting, who has

been president of the Power Specialty Co. a similar time, will be president. John Primrose of the Power Specialty Co. will be vice-president in charge of the oil division and H. S. Brown of the Wheeler company will be vice-president in charge of the condenser division. W. E. Dowd will be secretary, he having served the Power Specialty Co. in the same capacity. All selling offices of the two companies will be consolidated, but no important changes in production will be made.

Annual Meeting of Ohio Foundrymen

The annual convention of the Ohio State Foundrymen's Association will be held at Cedar Point, Ohio, Aug. 19 and 20. Speakers include Stuart Wells Utley, Detroit, president American Foundrymen's Association, whose topic will be "The Foundry Industry"; Eugene W. Smith, general foundry superintendent Crane Co., Chicago, whose subject will be "Sand Control from a Foundryman's Viewpoint"; Phil Frankel, member of the law firm of Frankel & Frankel, Cleveland, who will talk on "New Merchandising Methods for the Foundry Industry," and Willis Wissler, bureau of research Ohio State University, Columbus, Ohio, whose topic will be "Labor Management."

In addition to the addresses there will be round table discussions on foundry costs and other foundry problems. An informal banquet will be held on the evening of Aug. 19.

American Rolling Mill Co. Buys Columbia Steel Co.

The American Rolling Mill Co. has bought the plant and business of the Columbia Steel Co. and the Forged Steel Wheel Co., with plants at Butler, Pa., and Elyria, Ohio, according to a statement received as this issue was going to press. The fact is of unusual significance, seeing that the Columbia company has developed a mill for the continuous manufacture of wide strips or stripsheets and has been looked on as a formidable element in the present movement looking to the large scale production of a sheet product by a departure from so-called conventional methods. The significance arises equally in the fact that the Armco organization has a high-production continuous process sheet mill at Ashland, Ky., recently rated at 1400 tons a day. These two epoch-making mills were only recently described at length in these columns, the Columbia article appearing May 19 and the Ashland Armco description, June 16.

Metal Trades to Exhibit at the Cleveland Exposition

The metal trades will be well represented at the Ohio-Cleveland Industrial Exposition, which will be held at the municipal auditorium, Cleveland, from Aug. 6 to 28. A great variety of finished products, as well as machinery and other plant equipment, will be shown. The following companies have engaged space:

Allyne-Ryan Foundry Co.; American Steel & Wire Co.; Bourne-Fuller Co.; Brown Holsting Machinery Co.; Buckeye Forging Co.; Chain Products Co.; Conneaut Shovel Co.; Champion Machine & Forging Co.; Cleveland Frog & Crossing Co.; Cleveland Graphite Bronze Co.; Cleveland Hardware Co.; Cleveland Welding & Mfg. Co.; Forest City Foundry & Mfg. Co.; Cleveland Wire Spring Co.; Cleveland Worm & Gear Co.; Eberhard Mfg. Co.; Henry Furnace & Foundry Co.; International Steel Tie Co.; Lake Erie Bolt & Nut Co.; Lakeside Steel Improvement Co.; Lang Body Co.; Holland Furnace Co.; Lamson & Sessions Co.; Mathews Steel Casting Co.; National Bronze & Aluminum Foundry Co.; National Malleable & Steel Castings Co.; National Screw & Mfg. Co.; Pressed Metal Products Co.; Republic Steel Package Co.; Rickersburg Brass Co.; Joseph T. Ryerson & Son, Inc.; Superior Foundry Co.; W. S. Tyler Co.; Van Dorn Iron Works; Walworth Run Foundry Co.; Wellman Bronze Co.; Wellman-Seaver-Morgan Co.; West Steel Casting Co.; Pickands, Mather & Co.; Scott-Fetzer Machine Co.

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Making Use of the Volume Index

SEMI-ANNUALLY THE IRON AGE issues an index to articles. It is sent regularly to those who have registered a request for it. Many of those on the index mailing list incorporate the index in binding the volumes. The compilation for the first six months of this year will shortly be ready for mailing and any one wishing to be included should write promptly.

A scanning of the subjects covered is reassuring as to the scope and character of the volume of reading matter. Cross-indexing is practiced in the tabulation but no more than seems necessary to help a reader locate what has been published on a given topic. By referring to classifications of particular interest one often finds matter which was overlooked in the original reading of the issues, and there is profit in delegating someone to use this directory to contents as a basis for discovering information which has escaped earlier scrutiny. The half-year index carries 3000 or more separate references.

This Issue in Brief

With output curtailed, steel prices may advance in autumn, Dr. Haney indicates. Production is nearly down to the normal rate, and is still declining; unfilled orders are at bottom levels. So it seems that steel markets should be firmer before long.—Page 152.

Reduces forging, pressing and shearing costs by substituting air for steam. No changes in the hammers are necessary. Air is heated to about 480 deg. Fahr., utilizing waste gases from the furnaces. Equipment maintenance costs are lower when air is used for power, and the delay in starting, due to condensation, is avoided.—Page 131.

Beware of the use of "scrambled" expressions, Electrochemical Society head warns "scientists in industry." When the laboratory worker translates the results of his tests, for the use of the men in the shop, he should go the whole way, and avoid such hybrid terms as "milligrams per sq. in."—Page 138.

Should the purchasing agent take advantage of errors in cost estimating? Die casting manufacturer says he has seen contracts for die castings placed where the purchasing agent knew the price quoted did not even cover the cost of the metal.—Page 140.

Sales opposition is too much to permit success of Master Brand sheets. Jobbers find they can not sell the heavier-coated sheets at the prices they are obliged to ask. Furthermore, the light coatings stand up better under bending and forming operations. All promotion efforts on Master Brand will be dropped or considerably modified.—Page 140.

"Buy Russian-made machinery" movement is not a decided success. Russian users reported that prices of domestic product are exorbitant and that quality is low.—Page 156.

Labor-saving devices represent America's chief hope in fight for world steel business. Foreign iron and steel mill wage rates are less than half those of domestic producers. The raw material hauls abroad are considerably shorter. Foreign mills have the advantage of low water rates, which are declining while American freight rates are rising.—Page 142.

Electric tack welds in steel-frame dwelling construction provide a strong, quickly made joint. Architecturally and structurally, the Weldcrete method follows wood-frame construction. Standard metal lumber is used, and is ordered cut to specifications. No drilling or punching of holes is necessary.—Page 137.

Die casting buyer will encounter snags if he compares estimates solely on price, neglecting to read the comments submitted with bids. Die casting manufacturers frequently recommend changes in design. These recommendations accompany the bids and should be carefully studied, for they affect the price. The buyer should insist upon a blue print being furnished him to show exactly what the supplier expects to furnish.—Page 140.

What is the significance of the June rise in the Steel Corporation's unfilled orders? For the first time since 1922 Dr. Haney's adjusted curve of unfilled orders rises in June. While the significance of the increase may be exaggerated, it does reveal that the largest producer is not permitting output to outdistance orders.—Page 151.

Scrap prices are not an infallible business forecaster. Not always does a reverse in the trend of scrap prices foretell a change in steel output. While a study of the behavior of scrap may be useful to the lay observer, the well-posted man gains time by securing the information upon which scrap reactions are based.—Page 161.

Must charge higher prices to domestic trade to balance losses on export business, say German iron and steel producers. They are fighting the movement to reduce the domestic (German) tariff, though German machinery builders are advocating a cut.—Page 155.

Has there been a bull market? Some tipping agencies are suggesting to their clients: "Is a bear market just ahead?" But the fact is that the bull market has been confined to certain groups of stocks, of which the rails and motors have been the most prominent. Meanwhile, holders of petroleum, textile, rubber, copper, meat packing, fertilizer and many other securities wonder what it's all about.—Page 160.

Pig iron prices are close to bottom, Dr. Haney believes. By September, at the latest, advances will take place, he forecasts. The market awaits only another dose or two of the good old remedy of production curtailment.—Page 152.

Before he enters the technical school, give the prospective student a year in the shop, educational head recommends. Practical experience should precede technical training. Let him get the contact first and so prevent a possible misfit. Then it will not be necessary to drop a large percentage of engineering students.—Page 163.

Ford buys some steel for new car models. Moderate-sized orders have been placed. It is understood that production will start in a limited way Aug. 1.—Page 173.

Statistics that show the trend of business. Fabricated structural steel bookings for the first half of the year totaled 1,252,920 tons, almost equalling the 1,268,820 tons booked in the same period of 1926.—Page 163. June sales of sheets were 224,321 tons, 22 per cent under June, 1926, but 6 per cent above May, 1927.—Page 157.

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Sheets Ex-Continuous Mill?

AND now the continuous sheet mill has felt the magic touch of the Wall Street Aladdins. A brokerage house in a recent circular devoted to this "revolutionary development in the sheet plate industry," points out that one company "has perfected and patented a new process for rolling sheets so that at the present moment they can be turned out at the rate of over one ton a minute." As indicating the enlarged earning power of this corporation's stock the public is informed that "the hot ingot is converted to the finished sheet by a continuous process, without handling by labor, and it is estimated that this process will save the company as much as \$28 a ton."

When he reads, a few lines later, that the capacity of the plant is 1400 tons a day, the investor would be blasé, indeed, if he did not consider the stock of a company able to "save" roundly \$39,000 a day, and presumably add this to its previous earnings, to be worth looking into.

For months sheet producers have been buffeted by a competition that at times, for some of those who buy their sheet bars in the market, has made operation more costly than shutting down. Even those companies which produce their own steel have found the spread between their metal cost and the market price of sheets painfully inadequate. It takes no intricate cost analysis to show how illusory are the "savings" which, for the promotion of Wall Street ends, have been so glowingly credited to the continuous mill.

Take, for example, 14-gage blue annealed sheets, which of late have been selling at 2.35 cents a pound, or \$47 a net ton. Ingot cost, under average good practice, may be put at \$25 a gross ton. The sheet mill, we assume, would be well satisfied with a 70 per cent yield of sheared sheets. On that basis the steel cost alone, on a net ton of 14-gage blue annealed sheets, would be \$32. Out of the market price of \$47 a ton this would leave \$15 a ton to cover every mill operation following the weighing of the ingot and every item of sheet mill cost—heating, rolling, power, maintenance, works overhead,

selling and administration, taxes, interest and the rest.

It would probably be found that, among sheet mills whose practice is well rated, not a few which make their own steel have had a net metal cost of \$33 to \$34 per net ton of 14-gage sheets, after allowing for scrap credit. In other words, instead of the \$28 "saving" of the Wall Street circular, the economies to be credited to the continuous mill are such portion of the \$14 or \$15 spread between metal cost and sheet selling price as is not absorbed by the items of sheet mill cost enumerated above.

In its editorial of May 19 on "The Evolution in Sheet Rolling," THE IRON AGE had in mind the exaggerated claims always made for new processes in suggesting that those who had made large outlays for continuous mills would need all the help of such mills in retrieving profits they had to forego in the fierce competition of many months. To put it in the language of Wall Street, it may be that sheet mill products have already sold ex-continuous mill.

Bulls and Bears

WHAT is called the bull market in stocks has now run so long that many speculative investors, not mere gamblers and plungers, are exercising great caution and contemplating what should be their position if, when and as winter comes. The tipping agencies, which profess to tell their subscribers how most profitably to conduct themselves, are suggesting, "Is a bear market just ahead?"

It may be, however, that we have already had our bear market without being aware of it. The holders of petroleum, textile, rubber, copper, lead, zinc, silver, meat packing and fertilizer securities—without attempting to enumerate a complete list—will inquire, if there be any further bear market, whether the securities of their companies are to be sold for a song.

In fact, the bull market of the last year has been only in some groups of stocks, whereof the rails

and motors have been the most prominent. In some of them speculation may have been overdone and correctives may be required. Forced liquidation may then depress further other stocks that appear now to have discounted most if not all of their own industrial adversity.

Anything of that sort, should it happen, would probably be quite different from a major bear market resulting from economic reverse. The confused and perplexing conditions of the moment are probably phases of the adjustment of our affairs to the basis of a consuming economy, as well as to competitive overproduction in the face of an enormous consumption. The danger signals will begin to fly when there are evidences of unemployment and curtailed consumption. When, for example, the use of gasoline begins to contract, it may be deduced that the ability of the people to enjoy consumers' goods has been crippled. Likewise, when attendance at the theaters and baseball parks falls off.

Meanwhile, to petroleum, textile, rubber, copper, lead, zinc, meat packing and fertilizer stockholders, and not a few others, the suggestion of an impending bear market is not likely to bring any great apprehension. Or are they, perhaps, like the man who, after falling into the river, did not care how hard it rained? All current views are not pessimistic, however, and there are some optimists who conceive that many commodity prices will improve before the end of this year; and even that some day the petroleum producers will again pay satisfactory dividends.

Scrap as a Barometer

IN the past two years or so forecasters have come to devote no little attention to the iron and steel scrap market, having become possessed of the idea that it has distinctly barometric possibilities. Already, however, we see indications that here may be found another illustration of the disposition of the iron and steel industry to depart from a precedent or rule of conduct as soon as such has been clearly developed.

It was observed some time ago that turns in the market price of heavy melting steel scrap on several successive occasions had antedated changes in the rate of steel production by a fairly uniform interval, averaging somewhat under two months. The price of scrap started going down before steel production began to decrease, and while it was still increasing and vice versa. Thus a very useful rule seemed to be furnished.

But we now find that while scrap turned upward approximately at the following times: 1924, May 15; 1925, June 20; 1926, June 5—in each of those years steel production was at a low point in July and showed heavier production in August, so that steel has followed the calendar uniformly while its assumed barometer has varied.

To an observer with limited sources of information the behavior of scrap may be very helpful, and to the best posted observer some assistance will be given, but after all it is elementary that these changes in the market value of scrap have causes. The markets are made by men who have certain information upon which they act, as buyers and sellers, respectively. If, then, the observer can secure that information, he has something better. He gains time. The scrap market is really a channel

through which information leaks out to the general public. One should look for information at the source.

The course of the scrap market, furthermore, is influenced by the personal views of three classes of men, the originators (including the small collectors), the large dealers and the consumers. Should any rule be developed, these men would hasten to profit by the knowledge and endeavor to "beat the game." Thereby their conduct would alter the course of the market. As soon as a rule was well established the tendency would be for it to break down.

Then there are changes within the trade which affect the showing. Freight rates are higher and price fluctuations smaller than they used to be, and thus the large dealer cannot, as formerly, accumulate speculative scrap in yard in periods of low prices and liquidate in periods of high prices. Dealers' yard stocks nowadays are of scrap which the dealer has produced in the yard, from material not in consumable form but requiring to be sorted or cut up. Thus the older precedents are made useless.

Also, there are changes in the relative value of scrap at different consuming points, so that no one market can be selected as wholly typical, while a composite could not be constructed upon permanent lines. In the recent past there is the development of a large movement of scrap at a low water rate from Detroit to Buffalo, whereby the Buffalo market is lower than it otherwise would be and the market delivered at interior Ohio points is higher. In a given week Chicago and eastern Pennsylvania sometimes move in opposite directions.

Thus in endeavoring to secure barometric information from the scrap market one should first look to the sources of information which affect scrap values and then should allow for phenomena which are purely local in the different scrap consuming districts. Careful study of all trade and market news is essential. There is no easy road in forecasting.

Petroleum from Coke

IT has not yet been necessary for us in the United States to concentrate our attention on the utilization of low-grade coal, or the synthesizing of petroleum products. We have such a superabundance of these at hand that we have contented ourselves with skimming the cream. For this reason by-product coke ovens, gasoline cracking plants and sealed gas wells have been comparatively recent arrivals.

An entirely different situation exists in Germany. If any German manufacturer was unaware of the facts, the great war demonstrated that his nation must have independent supplies of nitrates (for fertilizer and explosives), of petroleum products (for lubrication and fuel), and of rubber. During those years great ingenuity was exerted in developing usable substitutes; since that time much progress has been made in synthesizing these so-called "organic" substances from such low-grade raw material as lignite and the air.

It is not to disparage the extent of their achievements to point out that the Germans have been forced to these discoveries at a quickened pace by economic pressure. The nitrogen problem has al-

ready been solved so completely that artificial compounds are cheaper to use than Chilean nitrate. Turning his attention to the others, the German investigator finds a commercial situation which erects more than one target to shoot at. For instance, if a man is able to make coke of low-grade lignite, and produce simultaneously some valuable by-products, he not only gets money from the by-products, but is also able to sell the coke, something which he probably couldn't do in America, where the householder or factory manager is already habituated to a good grade of anthracite or bituminous, and is moving upward into gas and oil burners, rather than into the use of the bulkier coke.

American chemical industry has already imported so many of the German discoveries that the recent progress in fuel research, described by Dr. Hans Tropsch of the Kaiser Wilhelm Institute, who is now in this country, has especial significance. Bergius, as long ago as 1913, was able to convert 85 per cent of a finely pulverized coal into liquid or gaseous compounds by heating it to 450 degrees with hydrogen at several thousand pounds per square inch. While a semi-commercial plant has been in intermittent operation ever since, the process has never achieved success. One of the difficulties, it might be guessed, is to find some strong alloy for containers which would not become dangerously embrittled by the hydrogen under the severe working conditions.

A more promising variation of Bergius's process is being developed by Badische Anilin und Soda-fabrik, whereby the use of proper catalysts not only allows the reactions between coal and the hydrogen to proceed at more moderate pressures and temperatures, but also directs the reactions into larger yields of the more valuable products. It is reported that this has been so successful that the problem now resolves itself into a cheap production of pure hydrogen.

Still a third line of attack bids fair to equal the success already achieved in the artificial manufacture of wood alcohol and "synthol," a substitute motor fuel. Proceeding along the same lines, water gas made from hot coke and steam at atmospheric pressure is passed over catalysts like finely divided iron, copper and cobalt in various combinations and proportions. In semi-commercial operations, up to 15 per cent of the gas is thus converted into hydrocarbons of the paraffin series, exactly the same as those derived from petroleum. Crude naphtha, made in this way, is free from sulphur, is water clear and stable; the last fractions also produce lubricating oils.

Whether or not Dr. Tropsch and his associates have hit upon the essential process used in by-gone ages to form our underground supplies of oil, the indications are that they are developing methods whereby Germany can make her own oils and "gas" from her low-grade lignites, and any other country with coal deposits can push off into the indefinite future the calamity of a failing supply of petroleum.

PREVENTION of that disease of boiler plate steel commonly known as caustic embrittlement seems more nearly possible than at any previous stage in the fight that has so long been made on it. Professor Parr of the University of Illinois, where the subject has been under investigation for a num-

ber of years, announced at the recent convention of the American Society for Testing Materials that additions to the boiler water of sodium phosphate and other salts had resulted in materially extending the life of the steel. Further study is expected to yield important results now that the lines of remedial action have become better defined. Realization of the promise thus held out would mean no small addition to boiler safety as well as to the effective life of boiler steel.

Electric or Crucible Steel for Tools

CONTROVERSY over the relative merits of the crucible and the electric furnace processes, particularly for tool steel, is not yet out of date; there are those who insist and with reason that crucible steel will always be in demand for certain uses in industry. The statistical showing, however, has been decidedly in favor of electric steel. In 1914 the crucible steel ingot output of the United States was over 78,600 gross tons; in 1926 it had declined to 13,500 tons, though the total ingot production for that year was the largest on record. In 1914 only about 15,500 tons of electric steel ingots was made; for 1926 the figure was 325,300 tons, with even more made in 1925.

In this connection it is significant that quite recently the last tool steel company in the United States making crucible steel exclusively ordered the installation of an electric furnace which will largely supplant the older process. While this does not mean the passing of the crucible process for tool steel in general, it does emphasize a trend which has been very marked ever since the coming in of electricity as a melting and refining agent only a few years ago. Generally speaking, however, the selection of a process is largely a matter of cost. With proper materials, crucible steel can be made at least equal and possibly superior to most electric steel, but the flexibility and other characteristics of the newer process give greater possibilities of economy.

CORRESPONDENCE

Scrap in Blast Furnace Burdens

To the Editor: In *THE IRON AGE* of June 15, page 1741, I am quoted as saying that the three largest merchant iron producers in this district use 10 to 15 per cent scrap. This is not what I said, and I will thank you to correct the statement as follows:

Of the three largest producers of pig iron in the Birmingham District one furnace uses virgin ore without any scrap, one furnace uses a very small amount of scrap and one furnace runs regularly with 10 to 15 per cent scrap.

My statement was that the furnace with the most scrap seemed to make the lowest carbon metal by some 10 or 15 points, and when making pipe which required a low carbon we preferred this metal.

Whether it is a peculiarity of the furnace using the scrap or whether it is by nature of the ore and the blast furnace practice this carbon is kept down, we do not know. In fact, we are not certain that the carbon is what gives us seemingly better results from this pig iron, because that makes a very small difference in percentage of carbon which we use.

J. T. MACKENZIE.

Chief chemist American Cast Iron Pipe Co.
Birmingham, Ala., July 12.

Fitting Men for Industrial Positions

What Shortcomings There Are in Present Educational Methods—
Manufacturing Plants Are Essential Units
in Any Training Course

PROBLEMS concerning the education of young men for important places in industry were discussed last week at the Institute of Chemistry, meeting at Pennsylvania State College. It was generally admitted that the universities and technical colleges could best devote their attention to developing brain power and giving the student fundamental information on as wide a variety of associated subjects as time would permit, leaving the industries to give him the essential detailed information necessary for a specialist.

Engineering Schools Should Recruit from Trade Schools

Technical training should follow and not precede the student's personal contact with industry, said Prof. R. E. Bowman of the Wilmington (Del.) Trade School, addressing a conference of educators. He pointed out two ways in which this should be done. "First, vocational, or corporation schools, such as the General Motors Institute of Technology, the Henry Ford Trade School, Dunwoody Institute, and the Westinghouse Technical Night School, should be established in every large industrial center. Second, every boy who desires to take a course in engineering should actually work one full year in a plant before he is admitted to such a trade school or technical college. Do not wait until he has spent one year or four years in school before giving him a contact with industry. Let him get the contact first and so prevent a possible misfit. Then you will not need to drop a large percentage of your engineering students. Let the engineering schools recruit students through the industries and not through the preparatory schools. If a boy has enough in him to stand a year's work in the plant, he then is good material."

College Graduate Too Cock-sure

Dean Gerald L. Wendt of Pennsylvania State College criticized modern education on the count that it crams the head with facts instead of training the intellect to reason. "Insatiable curiosity has given way under modern educational methods to cock-sureness," he said. "The enormous amount of accumulated knowledge, taught to students, is giving many of them the impression that everything has been discovered. Thus they develop a pride in what they do know and lose that insatiable curiosity essential to further progress.

The instruction now given in all our schools from kindergarten up is designed to drill into the minds of the students what we now know and to give it to them in the shortest and most condensed form.

"Too often the 'good' student is one with a mind like a catalog or an encyclopedia. He does well in school, but he does not realize that when he enters the profession what he will have to deal with is not so much things that are known as entirely unknown factors. The colleges are therefore turning out too many men who have a store of knowledge but little ability to think and not enough imagination to attack the great problems not only in applied science but also of political life.

"The investigating habit and the curiosity that children have in early life is the most valuable thing that they can carry over into their grown-up years, but in our present system of education is a thing that is most likely to be killed. Our industries will do much better in the hands of men who know how little they know about the universe, rather than under the control of men who are cock-sure of their knowledge and proud of what the rest of the world has accomplished."

Industries Act as Teachers

The educational aspect of industrial work which develops specialists was stressed by R. E. Rose of E. I. duPont de Nemours & Co. "Hundreds of thousands who never enter college and those who do not go through high school get the education which, though not formal, leads up to useful and successful maturity. The industries act as teachers, but they let the student learn by trial and error. Industry thus pays for their mistakes and maintains the student for long periods of unproductiveness, meanwhile looking after his material wants and health.

"For the technical positions the industries ask that they be furnished men who are not the products of specialized training, but are educated men with breadth enough to enter any field. The man who receives such an academic training and then has added to it the training in experience offered by industrial production becomes a specialist with a breadth of view sufficient to enable him to succeed. He does not need to consider himself in any way inferior, in his profession, to his university trained colleagues or teachers and research workers in pure science."

FABRICATED STRUCTURAL STEEL

Bookings Off in June but Half Year Close to Same Period of 1926

Bookings of fabricated structural steel in June, as reported to the Department of Commerce by 185 firms, were 174,537 tons, representing 64 per cent of capacity. Computing in the standard way, this works out at 203,520 tons for the industry, compared with 209,880 tons, or 66 per cent of capacity, in May, and with 232,140 tons, or 73 per cent of capacity, in June, 1926. In spite of the sharp falling off of May and June from last year's figures, however, the first six months come within 1.3 per cent of last year's total.

Shipments in June were computed at 235,320 tons, or 74 per cent of capacity. This is the highest total since last October. Shipments during the first half year have fallen considerably below a year ago, as indicated in the table.

	Bookings		Shipments	
	Per Cent Capacity	Computed Tonnage	Per Cent Capacity	Computed Tonnage
1927				
January	54	171,720	55	174,900
February	69	219,420	57	181,260
March	66	209,880	63	200,340
April	75	238,500	66	209,880
May	66	209,880	67	213,060
June	64	203,520	74	235,320
Total (6 mo.)..	66	1,252,920	64	1,214,760
1926				
January	58	184,440	65	206,700
February	58	184,440	60	190,800
March	66	209,880	77	244,860
April	70	222,600	77	244,860
May	74	235,320	75	238,500
June	73	232,140	84	267,120
Total (6 mo.)..	67	1,268,820	73	1,392,840
July	69	219,420	83	263,940
August	80	254,400	78	248,040
September	59	187,620	79	251,220
October	64	203,520	79	251,220
November	61	193,980	70	222,600
December	71	225,780	67	213,060
Total (12 mo.)..	67	2,553,540	75	2,842,920

Iron and Steel Markets

Buying Shows Moderate Improvement

Outlook for Continued Light Ordering for Some Weeks with
Production and Prices Steady—Some Declines in
Pig Iron—Scrap Higher in Several Centers

MODERATE improvement in volume of business over that earlier in the month is the report from most steel companies. The unexpected, although small, expansion is viewed by producers and consumers alike as indicating a steady, continued flow of small orders until general replenishment and crop influences work to swell the demand.

The rate of steel-making operations is unchanged, and the various finishing mills are able to deliver closely after the receipts of specifications or new orders. Here and there, rolling mills are idle one week and active the next, thus to secure economies by waiting for accumulations. The generally favorable sentiment toward a better outlook is doing much to hold prices against the test of definitely large buying.

Inquiries for building steel bulk large. With allowance for the present season of peak consumption, the needs of the oil industry for storage tanks are widening. The Ford Motor Co. has placed some moderate size orders for an expected limited manufacturing program on its new models beginning Aug. 1. The railroads, alone among large steel users, do not figure prominently this week.

Pig iron buying has improved, notably at Cleveland, where sales totaled 45,000 tons, and at Boston and Cincinnati. In New York and New England melters are showing more interest in fourth quarter iron, but no real buying movement has developed and competition is increasingly keen. With some of their shipments held up, furnaces are seeking new outlets for their iron. In Michigan and in eastern Pennsylvania foundry iron has declined 50c. a ton to \$18.50 and \$20, base furnace, respectively, and Cleveland iron for delivery in competitive territory has been sold at as low as \$17, furnace. In Michigan, which reflects the situation in the automotive industry, foundry melt during July promises to be lower than for any month this year.

Producers of sheets are watching quotations as keenly as buyers. On an inquiry in New York for 2000 tons, no concessions appeared among many bidders. Uncompleted second quarter contracts still stand on order books, but they are now being rapidly cleared away and most of the new business is done at the full prices announced in May. Shipments of sheets over the first half of the year were on a par with the average for the best three years. Surplus oil production is taking quantities of blue annealed sheets for small tanks.

The advance in nails late in June to \$2.55, Pittsburgh, per 100 lb. has been accepted in numerous small sales, but jobbers will not need to buy until late in August, when they will be expected to cover for a three months' period instead of the usual 60 days.

Makers of large rivets on July 15 decided to ask \$3 per 100 lb., or 25c. more than on orders they had booked.

An effort is being made to get \$34 per gross ton for sheet bars, Pittsburgh or Youngstown basing, but the Cleveland price remains \$33.50. On the next buying movement on wire rods Chicago producers, who find specifications active on third quarter contracts, are expected to try for \$44, the top of the present range.

In a scrap market that still lacks a definite trend, heavy melting steel has advanced 50c. a ton at Cincinnati and Boston and 25c. a ton at Cleveland. At Philadelphia, where there is a surplus of heavy melting steel, a shortage is developing in other grades, because dealers and scrap producers are disinclined to sell at prevailing low prices. A Cleveland mill has bought 30,000 tons of heavy melting steel, one-half of which will be shipped from Detroit by water. The purchase has strengthened scrap prices in Michigan, although in Cleveland it had little effect.

Sales of spiegeleisen at Chicago reflect a decline of \$1 a ton to \$33, furnace, for the 19 to 21 per cent grade.

Lagging purchases by municipalities and shrinking backlogs at pipe foundries have resulted in a reduction of \$1 a ton in cast iron water pipe to \$33, Birmingham, for 6-in. and larger diameters.

Structural steel orders of 40,500 tons include 8000 tons for a hotel addition in Pittsburgh and 6500 tons for a bank building in Brooklyn. Added to work pending were inquiries for 44,600 tons, of which 6000 tons is for a bank in New York, 4000 tons for a bridge across the Ohio River at Cincinnati and 3500 tons for a Los Angeles hotel.

Fabricated structural steel booked in the first half of 1927, at 1,252,920 tons, was only 1.3 per cent behind 1926, with 1,268,820 tons. Shipments fell off heavily, however, from 1,392,840 tons to 1,214,760 tons.

Further use of Lake transportation is shown by the putting in commission of a small Lake freighter by the Otis Steel Co. for taking steel to Detroit and bringing back scrap.

Stocks of Lake Superior ore at furnaces and Lake Erie docks amounted in round numbers to 27,000,000 tons on July 1, against 21,500,000 tons on the same day last year. Curtailment of the Lake fleet operations is accordingly expected.

THE IRON AGE pig iron composite price has fallen to \$18.50 from \$18.59 last week, recording again the lowest figure in more than five years. It is just \$1 below its level of one year ago. The finished steel composite price remains at 2.367c. a lb. for the sixth week.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
No. 2, fdy., Philadelphia...	\$20.76	\$21.26	\$21.76	\$21.76
No. 2, Valley furnace....	18.00	18.00	18.00	17.75
No. 2, Southern, Cin'ti....	20.94	20.94	21.69	24.19
No. 2, Birmingham.....	17.25	17.25	18.00	21.00
No. 2 foundry, Chicago*....	20.00	20.00	20.00	21.00
Basic, del'd eastern Pa....	20.75	20.75	20.75	21.00
Basic, Valley furnace....	17.50	17.50	18.00	17.50
Valley Bessemer, del. P'gh	20.26	20.26	20.76	20.26
Malleable, Chicago*.....	20.00	20.00	20.00	21.00
Malleable, Valley	18.00	18.00	18.00	17.75
Gray forge, Pittsburgh....	19.26	19.26	19.26	19.01
L. S. charcoal, Chicago....	27.04	27.04	27.04	29.04
Ferromanganese, furnace..	90.00	90.00	90.00	88.00

Rails, Billets, etc., Per Gross Ton:	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
O.-h. rails, heavy, at mill..	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	34.00
Bess. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh...	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh....	34.00	33.50	33.50	36.00
Forging billets, P'gh.....	39.00	39.00	39.00	40.00
O.-h. billets, Phila.....	38.30	38.30	39.30	40.30
Wire rods, Pittsburgh....	42.00	42.00	42.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90

Finished Iron and Steel,	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	2.12	2.12	2.12	2.22
Iron bars, Chicago.....	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh....	1.80	1.80	1.80	2.00
Steel bars, Chicago.....	2.00	2.00	2.00	2.10
Steel bars, New York....	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh...	1.80	1.80	1.80	1.90
Tank plates, Chicago.....	2.00	2.00	2.00	2.10
Tank plates, New York....	2.09	2.09	2.09	2.24
Beams, Pittsburgh.....	1.80	1.80	1.80	2.00
Beams, Chicago	2.00	2.00	2.00	2.10
Beams, New York.....	2.04	2.04	2.04	2.34
Steel hoops, Pittsburgh...	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire,	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	2.95
Sheets, black, No. 24, Chi-				
cago dist. mill.....	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh	3.85	3.85	3.85	3.80
Sheets, galv., No. 24, Chi-				
cago dist. mill.....	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh..	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chi-				
cago dist. mill.....	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh....	2.55	2.50	2.50	2.65
Wire nails, Chicago dist.				
mill	2.60	2.55	2.55	2.70
Plain wire, Pittsburgh....	2.40	2.40	2.40	2.50
Plain wire, Chicago dist.				
mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh..	3.25	3.20	3.20	3.35
Barbed wire, galv., Chi-				
cago dist. mill.....	3.30	3.25	3.25	3.40
Tin plate, 100 lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
Heavy melting steel, P'gh.	\$15.00	\$15.00	\$14.75	\$17.00
Heavy melting steel, Phila.	<i>13.00</i>	13.50	14.00	15.25
Heavy melting steel, Ch'go	12.00	12.00	12.00	14.50
Carwheels, Chicago.....	13.50	13.50	13.50	16.50
Carwheels, Philadelphia..	15.00	15.00	15.50	17.00
No. 1 cast, Pittsburgh....	15.00	15.00	15.00	16.00
No. 1 cast, Philadelphia..	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	17.50
No. 1 RR. wrot, Phila....	<i>15.50</i>	16.00	16.00	16.50
No. 1 RR. wrot, Ch'go (net)	11.50	11.25	11.00	13.50

Coke, Connellsville, Per Net Ton at Oven:	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
Furnace coke, prompt....	\$3.00	\$3.00	\$2.90	\$3.00
Foundry coke, prompt....	4.00	4.00	4.00	4.00

Metals,	July 19, 1927	July 12, 1927	June 21, 1927	July 20, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.75	12.62 1/2	12.62 1/2	14.25
Electrolytic copper, refinery	12.50	12.37 1/2	12.25	14.00
Zinc, St. Louis.....	6.17 1/2	6.17 1/2	6.20	7.45
Zinc, New York.....	6.52 1/2	6.52 1/2	6.55	7.80
Lead, St. Louis.....	5.95	5.95	6.10	8.50
Lead, New York.....	6.20	6.20	6.40	8.65
Tin (Stralts), New York...	63.75	63.50	67.37 1/2	63.37 1/2
Antimony (Asiatic), N. Y.	<i>11.50</i>	11.75	12.50	14.50

Pittsburgh

Steel Works Output Maintained—Mill Prices Show Little Change

PITTSBURGH, July 19.—The past week has seen no marked change in steel works operations in this district, though there has been a slight letup in the mill output of some lines, such as hot-rolled flats and cold-rolled strips. Production of ingots by the Steel Corporation is estimated at approximately 75 per cent of capacity, while the independent output is placed at between 55 and 60 per cent. In the Mahoning Valley there has been a slight increase in ingot production, the independent output being about 62 per cent, with 33 out of 53 open-hearth furnaces in operation. This production will be increased by the addition of another furnace in a day or so. The Carnegie Steel Co. is operating at about 80 per cent of capacity in the Valley. The production of pig iron has shown a further decline. The M. A. Hanna Co. has blown out its furnace at Dover, Ohio, and the Republic Iron & Steel Co. has put out of blast the No. 4 stack at its Hazelton plant in Youngstown. There are now six out of 21 merchant stacks in operation in western Pennsylvania and the Valleys.

The market for pig iron is extremely dull, but the fact that consumers are reported to have only small stocks on hand leads to the belief that they will be compelled to come into the market before long. The steel market also is quiet. Sheet bars have shown a slightly firmer tone and now are quoted at \$34, Pittsburgh or

Youngstown. The market for plates, shapes and bars shows signs of irregularity, with the prevailing quotation 1.80c., Pittsburgh. Of the three products steel bars show the most strength, while shapes are perhaps the weakest. Fabricators are doing considerable estimating, but actual closing of business is slow. The largest award made in this district during the past week went to the American Bridge Co. and involved 8000 tons for the William Penn Hotel, Pittsburgh. Producers of wire and wire products report an improvement in specifications and claim that the price situation is stronger.

Pig Iron.—With no inquiries for sizable tonnages and buying stagnant, the pig iron market probably is going through as dull a period as it ever experienced. Due in part to the summer vacation period, the lack of activity is also attributed to the fact that consuming interests still have supplies on hand. Their stocks, however, are going into consumption and are understood to be nearly exhausted. In view of this situation, producers say a buying movement in the comparatively near future may be expected to develop. The absence of a test leaves the price situation uncertain. Meanwhile merchant furnaces continue to quote No. 2 foundry and malleable at \$18, Valley, basic at \$17.50, Valley, and Bessemer at \$18.50, Valley. Some iron is being piled at furnaces, but production is being held down to a minimum. There are now six out of 21 merchant furnaces in operation in the Valleys and western Pennsylvania, the Dover, Ohio, furnace of the M. A. Hanna Co. having been blown out during the past week. The Republic Iron & Steel Co. also has blown out its No. 4

stack at Hazleton. This leaves two blast furnaces of the Republic company in operation.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.00
Low phosphorus, copper free....	\$27.50 to 28.00

Freight rate to the Pittsburgh or Cleveland district, \$1.76.

Ferroalloys.—New business in ferroalloys, spiegel-eisen and 50 per cent ferrosilicon is still very slow, and the relatively low rate of steel works operations is reflected in specifications on contracts for these alloys. In a general way the market is quieter now than it has been at any time before this year. There are no suggestions of any change in prices.

Semi-Finished Steel.—While only moderate activity prevails in the market for semi-finished steel, the price of sheet bars has become firmer and now is established at \$34, Pittsburgh or Youngstown. Mills in the Mahoning Valley had previously announced that price for the third quarter and were holding to it, but the figure of \$33.50, Pittsburgh, had not disappeared until the present week. Light demand exists for wire rods, which producers continue to quote at \$43, base Pittsburgh or Cleveland, but there has not been sufficient new business to test this level and the figure of \$42 has not disappeared. Rerolling billets, 4 in. and over, also are in small demand. The ruling price is \$33, Pittsburgh or Youngstown.

Bars, Plates and Shapes.—Considerable irregularity is noted in the volume of new business in plates, shapes and bars, with the result that the market is not so stable as it would be otherwise. The present week has seen a somewhat better inflow of orders than came to mills in this district in the previous week. The ruling price on all three products appears to be 1.80c., Pittsburgh, and seems to be well maintained as to plates and bars, with the latter showing a stronger tendency than the former. While there is a fair volume of inquiries and contracts in fabricated work, the price situation in shapes has shown no improvement. Fabricators are doing a great amount of estimating, but the actual closing of business during the past week has been slow. The largest award made went to the American Bridge Co., calling for 8000 tons for an addition to the William Penn Hotel, Pittsburgh. Most of the inquiries and contracts are for offices and mercantile establishments, with not much activity in industrial construction. The market for iron bars is dull.

Wire Products.—Manufacturers of wire and wire products report that the general situation with regard to specifications is better than might have been expected at this season. Distributors and consumers are said to have light stock, and they are showing rather encouraging activity in specifying against contracts. New business is only moderate, but producers claim that prices have become firmer and that they are adhering strictly to \$2.55, base Pittsburgh and Cleveland, on wire nails for jobbers in car lots. It is asserted that if any new business is going at \$2.50, it is being done

by others than the mills and does not figure as an important market factor. Contracts, however, are still being shipped against at the old price of \$2.50. Plain wire is fairly active and is quoted at \$2.40, base, per 100 lb. for No. 9 gage. It is estimated that finished wire production is at the rate of approximately 50 per cent of capacity.

Rails and Track Supplies.—It is reported that good-sized orders for standard-section rails are about to be placed and that a fair volume of the business will come to Pittsburgh mills. The market for track supplies is comparatively quiet, with no changes in prices.

Tubular Goods.—Overproduction of oil had an adverse effect on demand for line pipe, and dullness continues to characterize the situation as to oil well goods. Standard-weight pipe is showing fair activity. The most encouraging feature as to line pipe comes from the natural gas industry, from which the demand for tonnage is somewhat greater than it has been recently.

Tin Plate.—Shipments of tin plate for the current year to date are but 5 to 6 per cent less than those for the corresponding period of last year, when a record was made. This phase of the situation is being reckoned as an outstanding proof of the soundness of the market, which just at present is only moderately active. The hot weather has had the effect of decreasing production, but at the same time has advanced crops. The condition of the current market is due to the fact that consumers for the most part are covered, although demand from general sources, such as industries making paints, oils, drugs, hospital supplies, etc., is fair.

Cold-Finished Steel Bars and Shafting.—The usual July-August lull in the automotive industry has had its effect on the market for cold-finished steel bars, with the result that specifications are only fair. At the same time makers report that they have built up a substantial backlog. Operations are estimated at 60 to 65 per cent, although some plants are producing at a rate of 50 to 55 per cent of capacity. Makers in the Pittsburgh and nearby districts say that they are holding to the price of 2.30c., base Pittsburgh, on general business for the third quarter and that the level of 2.20c., base Pittsburgh, is made only to large consumers, including some of those in the automotive industry.

Hot-Rolled Flats.—The demand for strips, hoops and bands is light, but specifications are fair. Mill operations are somewhat smaller than they were a week ago.

Cold-Rolled Strips.—Operations in the cold-rolled strip industry are estimated at about 60 to 65 per cent of capacity and have shown a slight decrease. Prices remain unchanged. Demand is only moderate, but producers are looking for an improvement.

Bolts, Nuts and Rivets.—Effective July 15, makers of rivets, ½-in. and larger, increased their price 25c. per 100 lb. to \$3, base Pittsburgh or Cleveland, to non-contracting customers. Prices on other sizes of rivets, as well as for bolts and nuts, are unchanged. Makers' operations are at the rate of about 60 per cent. Demand from railroads is only moderate, but, in view of the season, is regarded as satisfactory. Miscellaneous buying is reasonably fair, and one of

THE IRON AGE Composite Prices

Finished Steel July 19, 1927, 2.367c. a Lb.

One week ago.....	2.367c.
One month ago.....	2.367c.
One year ago.....	2.431c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel

	High		Low	
1927	2.453c.	Jan. 4:	2.339c.	April 26
1926	2.453c.	Jan. 5:	2.403c.	May 18
1925	2.560c.	Jan. 6:	2.396c.	Aug. 18
1924	2.789c.	Jan. 15:	2.460c.	Oct. 14
1923	2.824c.	April 24:	2.446c.	Jan. 2

Pig Iron July 19, 1927, \$18.50 a Gross Ton

One week ago.....	\$18.59
One month ago.....	18.96
One year ago.....	19.50
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	\$19.71,	Jan. 4:	\$18.50,	July 19
1926	21.54,	Jan. 5:	19.46,	July 13
1925	22.50,	Jan. 13:	18.96,	July 7
1924	22.88,	Feb. 26:	19.21,	Nov. 3
1923	30.86,	March 20:	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel		Base Per Lb.
F.o.b. Pittsburgh mills	.....	1.80c. to 1.85c.
F.o.b. Chicago	.....	2.00c.
Del'd Philadelphia	.....	2.12c. to 2.17c.
Del'd New York	.....	2.14c. to 2.19c.
Del'd Cleveland	.....	1.99c. to 2.04c.
F.o.b. Cleveland	.....	1.80c. to 1.85c.
F.o.b. Birmingham	.....	1.95c. to 2.05c.
C.i.f. Pacific ports	.....	2.35c.
F.o.b. San Francisco mills	.....	2.35c. to 2.40c.

Billet Steel Reinforcing		Base Per Lb.
F.o.b. Pittsburgh mills	.....	1.80c. to 1.90c.
F.o.b. Birmingham	.....	1.95c. to 2.05c.

Rail Steel		Base Per Lb.
F.o.b. mill	.....	1.65c. to 1.80c.
F.o.b. Chicago	.....	1.90c.

Iron		Base Per Lb.
Common iron, f.o.b. Chicago	.....	2.00c.
Refined iron, f.o.b. P'gh mills	.....	2.75c.
Common iron, del'd Philadelphia	.....	2.12c.
Common iron, del'd New York	.....	2.14c.

Tank Plates

		Base Per Lb.
F.o.b. Pittsburgh mill	.....	1.75c. to 1.85c.
F.o.b. Chicago	.....	2.00c.
F.o.b. Birmingham	.....	1.90c. to 2.00c.
Del'd Cleveland	.....	1.99c. to 2.04c.
Del'd Philadelphia	.....	2.07c. to 2.17c.
Del'd New York	.....	2.09c. to 2.19c.
C.i.f. Pacific ports	.....	2.25c. to 2.30c.

Structural Shapes

		Base Per Lb.
F.o.b. Pittsburgh mills	.....	1.75c. to 1.85c.
F.o.b. Chicago	.....	2.00c.
F.o.b. Birmingham	.....	1.90c. to 2.00c.
Del'd Cleveland	.....	1.99c. to 2.04c.
Del'd Philadelphia	.....	1.92c. to 2.12c.
Del'd New York	.....	1.99c. to 2.14c.
C.i.f. Pacific ports	.....	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

		Base Per Lb.
All gages, narrower than 6 in., P'gh	.....	2.30c.
All gages, 6 in. to 12 in., P'gh	.....	2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh	.....	2.30c.
net	.....	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh	.....	2.40c.
net	.....	2.40c.
All gages, narrower than 6 in., Chicago	.....	2.40c. to 2.60c.
All gages, 6 in. and wider, Chicago	.....	2.20c. to 2.50c.

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

		Base Per Lb.
Bars, f.o.b. Pittsburgh mills	.....	2.20c. to 2.30c.
Bars, f.o.b. Chicago	.....	2.30c.
Bars, Cleveland	.....	2.35c.
Shafting, ground, f.o.b. mill	.....	2.45c. to 2.90c.
Strips, under 12 in., f.o.b. P'gh mill	.....	3.25c.
Strips, under 12 in., f.o.b. Cleveland mills	.....	3.25c.
Strips, under 12 in., delivered Chicago	.....	3.55c.
Strips, under 12 in., f.o.b. Worcester mill	.....	3.40c.
Stripsheds, 12 in. and wider, Pittsburgh mill	.....	3.00c.
Stripsheds, 12 in. and wider, Cleveland mill	.....	3.00c.
Stripsheds, 12 in. and wider, del'd Chicago	.....	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

		Base Per Keg
Wire nails	.....	\$2.55
Galvanized nails	.....	4.55
Galvanized staples	.....	3.25
Polished staples	.....	3.00
Cement coated nails	.....	2.55

		Base Per 100 Lb.
Bright plain wire, No. 9 gage	.....	\$2.40
Annealed fence wire	.....	2.55
Spring wire	.....	3.40
Galv'd wire, No. 9	.....	3.00
Barbed wire, galv'd	.....	3.25
Barbed wire, painted	.....	3.00

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

		Base to Retailers Per Net Ton
F.o.b. Pittsburgh	.....	\$65.00
F.o.b. Cleveland	.....	65.00
F.o.b. Anderson, Ind.	.....	66.00
F.o.b. Chicago district mills	.....	67.00
F.o.b. Duluth	.....	68.00
F.o.b. Birmingham	.....	68.00

Sheets

Blue Annealed		Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	.....	2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	.....	2.35c.
Nos. 9 and 10, del'd Philadelphia	.....	2.67c.
Nos. 9 and 10, f.o.b. Birmingham	.....	2.40c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	.....	3.00c.
No. 24, f.o.b. Chicago dist. mill	.....	3.10c.
No. 24, del'd Philadelphia	.....	3.32c.
No. 24, f.o.b. Birmingham	.....	3.15c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	.....	4.10c.
No. 24, f.o.b. Pittsburgh, B grade	.....	4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh	.....	3.85c.
No. 24, f.o.b. Chicago dist. mill	.....	3.95c.
No. 24, del'd Philadelphia	.....	4.17c.
No. 24, f.o.b. Birmingham	.....	4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	.....	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill	3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.25c.
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Long Ternes

No. 24, 3-lb. coating, f.o.b. mill	4.20c. to 4.30c.
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Tin Plate

		Per Base Box
Standard cokes, f.o.b. P'gh district mills	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)	
8-lb. coating I.C. \$11.40	25-lb. coating I.C. \$17.30
15-lb. coating I.C. 14.45	30-lb. coating I.C. 18.75
20-lb. coating I.C. 15.80	40-lb. coating I.C. 20.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series		Base Per 100 Lb.
Numbers		
2100* (½% Nickel, 0.10% to 0.20% Carbon)	.....	\$3.00
2300 (¾% Nickel)	.....	4.15 to 4.25
2500 (5% Nickel)	.....	5.25 to 5.50
3100 (Nickel Chromium)	.....	3.15 to 3.25
3200 (Nickel Chromium)	.....	4.75 to 5.00
3300 (Nickel Chromium)	.....	6.75 to 7.00
3400 (Nickel Chromium)	.....	6.00 to 6.25
5100 (Chromium Steel)	.....	3.20 to 3.30
5200* (Chromium Steel)	.....	7.00 to 7.50
6100 (Chrom. Vanadium bars)	.....	4.10 to 4.30
6100 (Chrom. Vanad. spring steel)	.....	3.60 to 3.80
9250 (Silicon Manganese spring steel)	.....	5.00 to 5.15

Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	.....	4.10 to 4.20
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	.....	4.10 to 4.20
Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	.....	4.00 to 4.25
Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	.....	3.20 to 3.30
Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	.....	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

		Per Gross Ton
Standard, f.o.b. mill	.....	\$43.00
Light (from billets), f.o.b. mill	.....	36.00
Light (from rail steel), f.o.b. mill	.....	34.00
Light (from billets), f.o.b. Ch'go mill	.....	\$36.00 to \$38.00

Track Equipment

(F.o.b. Mill)		Base Per 100 Lb.
Spikes, ½ in. and larger	.....	\$2.80 to \$2.90
Spikes, ½ in. and smaller	.....	2.80 to 3.00
Spikes, boat and barge	.....	3.10
Tie plates, steel	.....	2.35
Angle bars	.....	2.75
Track bolts, 1½ in. and ¾ in.	.....	3.90
Track bolts, ¾ in. and smaller, per 100 count	.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld		Steel		Iron	
Inches		Black	Galv.	Black	Galv.
1/8 to 1/4	.....	45	19 1/2	1/8 to 3/8	+11 +39
1/4 to 3/8	.....	51	25 1/2	3/8 to 1	22 2
3/8 to 1	.....	56	42 1/2	1 to 1 1/2	28 11
1 to 3	.....	60	48 1/2		30 13
1 to 3	.....	62	50 1/2		

Lap Weld

2	.....	55	43 1/2	2	.....	23	7
2 1/2 to 6	.....	59	47 1/2	2 1/2 to 6	.....	26	11
7 and 8	.....	56	43 1/2	3 to 6	.....	28	13
9 and 10	.....	54	41 1/2	7 to 12	.....	26	11
11 and 12	.....	53	40 1/2				

Butt Weld, extra strong, plain ends

1/8 to 1/4	.....	41	24 1/2	1/8 to 3/8	.....	+19	+54
1/4 to 3/8	.....	47	30 1/2	3/8 to 1	.....	21	17
3/8 to 1	.....	53	42 1/2	1 to 1 1/2	.....	28	12
1 to 1 1/2	.....	58	47 1/2			30	14
1 to 1 1/2	.....	60	49 1/2				
2 to 3	.....	61	50 1/2				

Lap Weld, extra strong, plain ends

2	.....	53	42 1/2	2	.....	23	9
2 1/2 to 4	.....	57	46 1/2	2 1/2 to 4	.....	29	15
4 1/2 to 6	.....	56	45 1/2	4 1/2 to 6	.....	28	14
7 to 8	.....	52	39 1/2	7 to 8	.....	21	15
9 and 10	.....	45	32 1/2	9 to 12	.....	16	2
11 and 12	.....	44	31 1/2				

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two-points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2 1/2 in.	.....	27	1 1/2 in. +18
2 1/2 to 3 in.	.....	37	1 1/2 to 1 3/4 in. + 8
3 in.	.....	40	2 to 2 1/4 in. — 7
3 1/2 to 3 3/4 in.	.....	42 1/2	2 1/4 to 3 in. — 7
4 to 4 1/2 in.	.....	46	3 1/4 to 4 1/2 in. — 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn		Hot Rolled	
1 in.	.....	60	3 in. 45
1 1/4 to 1 1/2 in.	.....	52	3 1/4 to 3 1/2 in. 47
1 1/2 in.	.....	36	4 in. 50
2 to 2 1/4 in.	.....	31	4 1/2, 5 and 6 in. 45
2 1/4 to 2 1/2 in.	.....	39	

2 and 2 1/4 in.	.....	37	3 1/4 and 3 1/2 in. 53
2 1/2 and 2 3/4 in.	.....	45	4 in. 56
3 in.	.....	51	4 1/2, 5 and 6 in. 51

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

		Per Cent Off List
Carbon, 0.10% to 0.30%, base	.....	55
Carbon, 0.30% to 0.40%, base	.....	50
Plus differentials for lengths over 15 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.		

the bright spots is the fact that there are little or no stocks on shelves.

Sheets.—Prices of sheets continue to be well maintained. The industry is operating at between 70 and 75 per cent of capacity. There have been some shut-downs for cleaning up, repairing, etc. Shipments in the first half of the present year were on a par with an average for the best three years. Blue annealed sheets proportionately are in better demand than the other grades. This is due in part to requirements for small bolted storage tanks to take care of surplus oil production. Galvanized sheets are reported to be in good demand, and so far this year shipments are only 4 per cent behind the same period of last year, which was next to best in the history of the industry. There is also a fair demand for black sheets. Business from the automotive industry has been improved somewhat because of the new models that have come out and are about to make their appearance.

Coal and Coke.—Reflecting the condition of merchant blast furnace operations, the market for beehive coke continues to drag. Adjusting themselves to the situation, producers in the Connellsville district have further restricted output so that there are practically no stocks, with the result that prices are relatively stable. Shipments are being made largely against contracts, and spot tonnages of 48-hr. fuel for the most part are selling at \$3, though the range runs up to \$3.10 and \$3.15. Tonnages for delivery in four to six weeks are quoted at \$3.25, the prevailing figure on last half contracts. One of the developments in the past week has been the demand for heating coke. No change has been made in prices of spot foundry coke, the market for which is also dull, though one interest reports having received a number of substantial orders during the past week. The market for coal continues to be inactive. The large supplies on hand and the growth of output in this district through the use of non-union labor by mines which formerly were organized apparently have led consumers to feel that there is no reason to come into the market except for immediate requirements. There are reports of organized labor's making efforts to spread and increase the effectiveness of the strike, but evidently if this is the case, the attempt is creating no concern on the part of either consumers or operators.

Old Material.—The market still shows a firm undertone but not much activity so far as local consumers are concerned. The markets to the west of Pittsburgh continue to show a good deal of strength as a result of covering of short sales by dealers, and scrap cannot be brought from the West past such points as Canton, Massillon and Youngstown, Ohio. Because of that fact and the possibility of a stronger situation in the East as a result of export developments, dealers are not pressing much scrap for sale. Dealers who are short are paying \$15 to \$15.25 for heavy melting steel, but only at one point in the district is the latter price obtainable and most consumers are not interested in supplies even at \$15. It seems doubtful whether there will be any immediate weakening of prices, because there is

considerable shortage and the market is sure of some support from dealer buying even if consumers do not immediately go into the market.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel.....	\$15.00 to \$15.25
Scrap rails	14.25 to 14.75
Compressed sheet steel.....	14.00 to 14.25
Bundled sheets, sides and ends...	13.50 to 14.00
Cast iron carwheels.....	15.00 to 15.50
Sheet bar crops, ordinary.....	15.00 to 15.25
Heavy breakable cast.....	14.50 to 15.00
No. 2 railroad wrought.....	15.00 to 15.25
Heavy steel axle turnings.....	13.50 to 14.00
Machine shop turnings.....	11.50 to 12.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers...	16.75 to 17.00
Railroad coil and leaf springs...	16.75 to 17.00
Rolled steel wheels.....	16.75 to 17.00
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate.....	18.50 to 19.00
Low phosphorus, light grade....	16.75 to 17.00
Low phosphorus sheet bar crops...	18.00 to 18.50
Heavy steel axle turnings.....	13.50 to 14.00
Electric Furnace Grades:	
Low phosphorus punchings.....	17.00 to 17.50
Heavy steel axle turnings.....	13.50 to 14.00
Blast Furnace Grades:	
Short shoveling steel turnings...	11.50 to 12.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings.....	10.50 to 11.00
No. 2 busheling.....	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles.....	19.00 to 20.00
No. 1 railroad wrought.....	12.00 to 12.50
Cupola Grades:	
No. 1 cast.....	15.00 to 15.50
Rails 3 ft. and under.....	16.00 to 16.50
Malleable Grades:	
Railroad	15.00 to 15.25
Industrial	14.50 to 14.75
Agricultural	14.00 to 14.25

Puddlers Granted Wage Increases—Advances Denied Bar Iron Finishers

YOUNGSTOWN, July 19.—The annual wage contract between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel & Tin Workers was renewed at conferences last week in Detroit. Puddlers were granted increases, but advances sought by bar iron finishers were denied. The new agreement is retroactive to July 1. Under the new scale puddlers will be paid \$11.55 per ton on a card rate of 1.95c. per lb., as at present, an advance of 42c. per ton. The new scale also provides a slightly higher increase in tonnage rates as the average selling price increases. With iron at 1c. per lb., the puddling rate is \$7 per ton, and increases 22.5c. per ton for each 5c. advance in the selling price of bar iron up to 1.40c. Above 1.40c. the rate advances 25c. a ton with each 5c. increase in the average selling price. Puddlers asked a higher rate because of increasing competition from mechanical puddling devices, such as that installed at Warren, Ohio, by the A. M. Byers Co., Pittsburgh. Initial conferences in May at Atlantic City resulted in disagreement.

Large Consumer Purchase Strengthens Detroit Scrap Mart

DETROIT, July 19.—Further evidence of strength was registered during the past week in the old material market in this district, with borings and short turnings and long turnings showing an advance of 25c. per ton. The biggest single factor in this forward movement was a purchase by a mill in the Cleveland district of 30,000 tons of heavy melting steel. A considerable tonnage of pig iron for third quarter delivery has been sold during the past two weeks without being in the nature of a buying movement. Melters are covering only for their actual needs, and the melt during July will probably be lower than for any month during the present year.

	Per Gross Ton
Heavy melting and shoveling steel.....	\$12.00 to \$13.00
Borings and short turnings.....	8.50 to 9.00
Long turnings	7.75 to 8.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	18.50 to 19.50
Hydraulic compressed sheets	11.25 to 11.75
Stove plate	13.50 to 14.50
No. 1 busheling	10.50 to 11.00
Sheet clippings	7.75 to 8.25
Flasings	10.50 to 11.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes.....	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats.....	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count, 62½ per cent off list	
Machine bolts, per 100 count, 62½ per cent off list	
Carriage bolts, per 100 count, 62½ per cent off list	
Nuts, all styles, per 100 count, 62½ per cent off list	
Large rivets, base per 100 lb.....	\$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.....	2.90
Common wire nails, per keg.....	\$2.80 to 2.90
Cement coated nails, per keg.....	2.85 to 2.95

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over.....	\$33.00
Rerolling, under 4-in. to and including 1½-in.....	\$33.50 to 34.00
Forging, ordinary.....	39.00 to 40.00
Forging, guaranteed.....	44.00 to 45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer.....	\$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger.....	\$33.00
Smaller than 8 in. x 2 in.....	34.00

Skelp

	Per Lb.
Grooved.....	1.80c. to 1.85c.
Sheared.....	1.80c. to 1.85c.
Universal.....	1.80c. to 1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base.....	\$42.00 to \$43.00
Screw stock.....	\$5.00 per ton over base
Carbon 0.20% to 0.40%.....	3.00 per ton over base
Carbon 0.41% to 0.55%.....	5.00 per ton over base
Carbon 0.56% to 0.75%.....	7.50 per ton over base
Carbon over 0.75%.....	10.00 per ton over base
Acid.....	15.00 per ton over base

*Chicago mill base is \$42.50 to \$44. Cleveland mill base, \$42 to \$43.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria.....	9.75c. to 10.00c.
Iron ore, Swedish, average 66% iron.....	10.50c.
Manganese ore, washed, 52% manganese, from the Caucasus.....	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%.....	40c. to 42c.
Tungsten ore, high grade, per unit in 60% concentrates.....	\$10.50 to \$11.00
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard.....	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered.....	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt.....	\$3.00 to \$3.25
Foundry, f.o.b. Connellsville prompt.....	4.00 to 4.50
Foundry, by-product, Ch'go ovens.....	9.75
Foundry, by-product, New England, del'd.....	12.00
Foundry, by-product, Newark or Jersey City, delivered.....	9.59 to 10.77
Foundry, Birmingham.....	5.50
Foundry, by-product, St. Louis.....	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines.....	\$1.30 to \$1.90
Mine run coking coal, f.o.b. W. Pa. mines.....	1.70 to 1.90
Mine run gas coal, f.o.b. Pa. mines.....	2.00
Steam slack, f.o.b. W. Pa. mines.....	1.25
Gas slack, f.o.b. W. Pa. mines.....	1.40 to 1.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd.....	\$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid.....	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%.....	\$33.00 to \$34.00
Domestic, 16 to 19%.....	32.00 to 33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%.....	\$85.00 to \$87.50
75%.....	145.00
	Per Gross Ton Furnace
10%.....	\$35.00
11%.....	37.00
	Per Gross Ton Furnace
12%.....	\$39.00
14 to 16%.....	\$45 to 46.00

Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%.....	\$34.00
11%.....	36.00
	Per Gross Ton
12%.....	\$38.00

Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%.....	\$26.50
7%.....	27.50
8%.....	28.50
9%.....	30.00
	Per Gross Ton
10%.....	\$32.00
11%.....	34.00
12%.....	36.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd.....	95c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads.....	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....	\$3.15 to \$3.65
Ferrocobalt, 15 to 18%, per net ton, f.o.b. furnace, in carloads.....	\$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton.....	\$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton.....	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines.....	\$17.00 to \$18.00
No. 2 lump, Illinois and Kentucky mines.....	\$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid.....	\$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines.....	\$32.50

Fire Clay

	Per 1000 f.o.b. Works
First Quality	Second Quality
Pennsylvania.....	\$43.00 to \$46.00
Maryland.....	43.00 to 46.00
New Jersey.....	50.00 to 65.00
Ohio.....	43.00 to 46.00
Kentucky.....	43.00 to 46.00
Missouri.....	43.00 to 46.00
Illinois.....	43.00 to 46.00
Ground fire clay, per ton.....	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania.....	\$43.00
Chicago.....	52.00
Birmingham.....	50.00
Silica clay, per ton.....	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.....	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.....	40.00

Chrome Brick

	Per Net Ton
Standard size.....	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

†Machine bolts.....	70
†Carriage bolts.....	70
Lag bolts.....	70
Plow bolts, Nos. 1, 2, 3 and 7 heads.....	70
Hot-pressed nuts, blank or tapped, square.....	70
Hot-pressed nuts, blank or tapped, hexagon.....	70
C.p.c. and t. square or hex. nuts, blank or tapped.....	70
Washers*.....	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh. †Bolts with rolled threads up to and including ½ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagon nuts.....	70
Semi-finished hexagon castellated nuts, S.A.E.....	70
Stove bolts in packages.....	80, 10 and 5
Stove bolts in bulk.....	80, 10, 5 and 2½
Tire bolts.....	60 and 5

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.75 to \$3.00
F.o.b. Chicago.....	2.85 to 3.10

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh.....	70, 10 and 5
F.o.b. Cleveland.....	70, 10 and 5 to 70 and 10
F.o.b. Chicago.....	70, 10 and 10 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws.....	80, 10 and 10
Milled standard set screws, case hardened.....	80 and 10
Milled headless set screws, cut thread.....	80
Upset hex. head cap screws, U.S.S. thread.....	85 and 5
Upset hex. cap screws, S.A.E. thread.....	85 and 5
Upset set screws.....	80, 10 and 10
Milled studs.....	70 and 5

Chicago

Keener Mill Competition in Plates, Shapes and Bars—Spiegeleisen Drops

CHICAGO, July 19.—The Inland Steel Co. has blown out its No. 2 blast furnace. This move is in accordance with a maintenance program initiated earlier in the spring and does not affect steel output in this district. The Steel Corporation has blown out No. 12 furnace at Gary and has lighted No. 6 furnace to take its place.

The steel market as a whole is moderately active, and close range buying has mounted to the heaviest tonnage since the middle of April. The largest increase in sales is in bars, specifications for which are ahead of the average in June.

Mill prices for plates, shapes and bars, while still at 2c., Chicago, are weakening under the pressure of outside competition. An Eastern producer named 1.90c., Chicago, on a round tonnage of bars, but lost the business to a Chicago mill at 2c. on the score of being unable to furnish all the sizes required by the buyer.

Fresh inquiry in shapes is heavy, and building projects now under consideration give promise of expanding fabricating shop output. New demand for oil storage tanks gives support to the general belief that crude oil production cannot be controlled and that tank erection will go forward after the summer demand for oil refinery products is past.

A number of coal mine operators are seeking protection on steel in small lots subject to shipment promptly on release. This move has not strengthened the belief of some that the miners and operators are still far apart in their wage controversy.

Pig Iron.—The Chicago market is quiet, with the bulk of sales calling for prompt delivery. To the East, especially in Michigan, competition is keen and several large tonnages, including 18,000 tons in one order, have been placed. A Cleveland producer has taken 4000 tons of foundry iron in northern Indiana at \$17, Cleveland. Chicago dealers do not hesitate to name \$19, Chicago furnace, on business in competitive territory. Locally, however, the price remains at \$20, base furnace, but lacks the strength shown earlier in the month. A few carloads of high silicon iron produced by a steel company stack have been sold below the market, for quick movement. A Chicago user who a week ago inquired for a round tonnage bought only a few carloads at \$20.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	23.26
Southern No. 2 (barge and rail)	21.43
Low phos., sil. 1 to 2 per cent, copper free	\$31.50 to 32.00
Silvery, sil. 8 per cent.	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet except in spiegeleisen. Round tonnages of the 19 to 21 per cent grade are being booked at \$33, Hazard, Pa., or \$40.76, delivered Chicago.

Prices delivered Chicago: 80 per cent ferromanganese, \$97.56; 50 per cent ferrosilicon, \$85 to \$87.50; spiegeleisen, 18 to 22 per cent, \$40.76 to \$41.76.

Plates.—New sales of plates are more numerous and represent in the main the diversified requirements of the manufacturing trade, which continues to place orders for immediate use. Mill deliveries, except on a few sizes from universal plate mills, are being made to meet buyers' demands. The total volume of sales this week is about equal to shipments, but specifications are smaller notwithstanding the fact that car builders are freely taking plates against recent contracts for railroad equipment. There are indications that car shops will not complete their present orders

as soon as shop capacity would permit, preferring to work at a moderate pace and to hold their organizations for a possible upturn in business late in the summer and in the early fall. Interest in oil storage tanks is widening, total outstanding inquiry having reached 16,000 tons. Fresh inquiry this week includes two lots, one of 5000 tons and one of 1000 tons, from the Mid-Continent field. Actual orders for tanks are slow in being placed. Oil production has not diminished, but this is the time of the year when consumption is at the peak and the need for storage facilities is less urgent than will be the case later in the year if oil output does not decline. Mill prices for plates remain at 2c., Chicago.

Mill prices on plates per lb.: 2c., base, Chicago.

Structural Material.—Fresh inquiry for fabricated steel bulks large this week, totaling not less than 20,000 tons. Structural shops in and around Chicago have stepped up output to about 60 per cent capacity. For the most part architects and engineers are busy, and the list of pending jobs is unusually promising for this time of the year. The difficulty in financing projects does not appear to have diminished, however. Among the larger tonnages that have come into the market is 3000 tons for a mill building for the Wisconsin Steel Works, South Chicago, Ill., and 1800 tons for a garage for the Nash Sales Co., Chicago. Orders for plain material are, in the main, individually small, and the bulk of going business is bringing 2c., Chicago.

Mill prices on plain material per lb.: 2c., base, Chicago.

Rails and Track Supplies.—This market has been quiet except for the placing of orders for 2000 kegs of spikes and 4000 tons of steel tie plates. The Chesapeake & Ohio has not yet come into the market for rails, but the trade is still expecting that business to develop. It is not unlikely that the Northern Pacific will soon inquire for 30,000 tons of standard-section rails. Production in this district averages 50 per cent of capacity in heavy rails, 50 per cent in spikes and 75 per cent in steel tie plates, output of the latter having dropped from 100 per cent in the last two weeks. Production of iron tie plates is tapering with the completion of contract obligations and with new buying light.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36 to \$38. Per lb.: Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Reinforcing Bars.—Awards for the week total 2500 tons, of which 2000 tons of billet bars is for a sewage disposal plant at Stickney, Ill. On the whole, this market is not active when consideration is given to the sizable list of pending projects. Fresh inquiry is in fair volume, but many projects are still to be financed and give little promise of reaching the stage of actual orders before early fall. Contracts in the past three weeks have increased pending shop operations to 65 per cent of capacity, and the tendency is still upward. Prices, both for new billet bars and the rail steel product, are weak with a tendency to decline.

Wire Products.—Orders for wire and wire products from all sources during the first half of July were about equal to bookings for the corresponding period in June. Specifications from the manufacturing trade are somewhat larger. Several buyers who hesitated at the turn of the month to contract for the third quarter have now done so. Low stocks in the hands of jobbers and indications of larger crops than had been expected earlier in the summer are held by the trade to be responsible for a fairly steady demand from distributors. Orders from the South are scarce, but the Middle West and the Northwest are providing a substantial amount of business. The demand for nails is improving, and the bulk of going sales are at \$2.60, Chicago. By far the largest part of current shipments, however, are being made against contracts at lower prices, which will still be in force for three to four weeks. Mill operations stand at 55 per cent of capacity. Mill prices are shown on page 167.

Cast Iron Pipe.—Competition for going tonnages is unusually keen, and quotations on 6-in. and larger pipe range from \$33 to \$34, Birmingham, depending on the size of the inquiry. Contract jobs, while not numerous, are for larger individual tonnages, the aggregate being

heavier than a year ago at this time. Orders from contractors in Chicago and nearby territory in the past week totaled between 5000 and 10,000 tons. Buying by municipalities is lagging, much to the disappointment of pipe makers, who had anticipated an active summer business from that source. On small tonnages there is a growing tendency to make purchases without inviting competition. Glencoe, Ill., has thrown out bids and will readvertise for 50 tons of 10-in., 90 tons of 8-in. and 25 tons of 6-in. pipe. A fresh inquiry of note comes from St. Paul, which is in the market for 1000 tons of 3-in. to 16-in. pipe. New orders include: 165 tons of 10-in. Class B pipe for Kenosha, Wis., placed with the National Cast Iron Pipe Co., 200 tons of 6-in. and 60 tons of 8-in. pipe for Norwalk, Wis., awarded to the American Cast Iron Pipe Co., and 330 tons of 6-in. and 165 tons of 8-in. pipe for Homewood, Ill. purchased from James B. Clow & Sons. Milwaukee is asking bids until July 26 on 550 tons of 8-in., 250 tons of 12-in. and 400 tons of 16-in. Class C pipe, and 47 tons of special castings.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$41.20 to \$42.20; 4-in., \$45.20 to \$46.20; Class A and gas pipe, \$4 extra.

Bolts, Nuts and Rivets.—Large rivets have been advanced effective July 15 to \$3.10, base per 100 lb., Chicago. This change in price comes at a time when contracts have been signed and the spot market is unusually dull. In contrast with large rivets, prices on small rivets are weaker and quotations common in this district are 70, 10 and 10 to 70, and 10 off list. Specifications for bolts and nuts are lighter, and prices are steady.

Sheets.—Steady demand and curtailment of output because of hot weather have served to strengthen the position of local producers, who now have backlogs of about four weeks. Deliveries have also extended, ranging now from three to five weeks on all products with the exception of roofing stock, which can be had in 10 days to two weeks. An indicated weakness in black sheets in competitive territory is not reflected as yet in the Chicago market, where at the moment that commodity is in larger demand than other products of local sheet mills.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bars.—Sales of soft steel bars are mounting, as a number of users who delayed action are now contracting for the third quarter. Specifications are the best in three weeks and shipments from mills so far in July are ahead of those for the first two weeks in June. Manufacturers of tractors continue to produce at a high rate and are entering liberal specifications. The agricultural machinery trade is becoming more active in preparation for a substantial volume of business this coming fall. Shipments to warehouses show a little improvement, but orders from that source are still below those of late June. While mill schedules are heavier than earlier in the month, producers are still able to meet deliveries expected by users. Buyers' resistance to quotations of 2c., Chicago, for iron bars has been without effect. Specifications are in fair vol-

ume, but new buying is unusually light. Demand for alloy steel bars is steady, and specifications indicate that production will remain steady through the rest of this month. New buying of hard steel bars is dropping sharply, but specifications are in larger volume and have again climbed above shipments. Barn equipment manufacturers are operating at an even pace, and increased specifications indicate that the bed manufacturers have expanded production after several months of low output.

Mill prices per lb.: Soft steel bars, 2c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 1.90c., base, Chicago.

Cold-Rolled Strip.—Although specifications are heavier by a small margin, producers have not been able to increase production above the current rate of 75 per cent of capacity. Prices are holding, but new business is not of large proportions.

Wire Rods.—Specifications from manufacturers are in good volume against third quarter contracts, which were placed within the price range of \$42.50 to \$44, Chicago. With the completion of the contracting period, mills are making an effort to establish prices at \$44.

Old Material.—Prices in this district are nominal in the absence of consumer purchases. For the most part, large users have covered for their immediate requirements and small buyers find the trend of business uncertain and their output reduced because of hot weather. Dealers believe that consumer stocks are low and that replenishment will be in order at an early date. This has given rise to a better feeling throughout the trade, and there are indications of greater willingness to speculate. Although railroad shipments have been heavy, outcoming scrap has been absorbed and distress tonnage has not been a factor in the market. Several large contracts, including one for 60,000 tons of heavy melting steel, are expiring this month, and this fact tends to offset any bullish feeling that may exist.

Prices delivered consumers' yards, Chicago:

<i>Per Gross Ton</i>	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$12.00 to \$12.50
Shoveling steel	12.00 to 12.50
Frogs, switches and guards, cut apart, and miscellaneous rails.	13.25 to 13.75
Hydraulic compressed sheets....	10.75 to 11.25
Drop forge flashings.....	9.25 to 9.75
Forged, cast and rolled steel car-wheels	14.25 to 14.75
Railroad tires, charging box size.	14.50 to 15.00
Railroad leaf springs, cut apart..	14.50 to 15.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles.....	14.25 to 14.75
Coil springs	15.00 to 15.50
Low phosphorus punchings.....	14.50 to 15.00
Electric Furnace Grades:	
Axle turnings	12.00 to 12.50
Blast Furnace Grades:	
Axle turnings	10.50 to 11.00
Cast iron borings.....	10.00 to 10.50
Short shoveling turnings.....	10.00 to 10.50
Machine shop turnings.....	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades:	
Steel rails less than 3 ft.....	15.50 to 16.00
Angle bars, steel.....	13.25 to 13.75
Cast iron carwheels.....	13.50 to 14.00
Malleable Grades:	
Railroad	13.50 to 14.00
Agricultural	13.50 to 14.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars.....	13.50 to 14.00
Iron arch bars and transoms....	18.50 to 19.00
Iron car axles.....	20.00 to 20.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	10.75 to 11.25
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	6.00 to 6.50
Locomotive tires, smooth.....	13.75 to 14.25
Pipes and flues.....	7.00 to 7.50
Cupola Grades:	
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	13.50 to 14.00
No. 1 agricultural cast.....	13.50 to 14.00
Stove plate	12.50 to 13.00
Grate bars	11.50 to 12.00
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

<i>Base per Lb.</i>	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforcing bars, billet steel.....	2.15c.
Cold-finished steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24).....	3.95c.
Galvanized sheets (No. 24).....	4.80c.
Blue annealed sheets (No. 10).....	3.50c.
Spikes, standard railroad.....	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
<i>Per Cent Off List</i>	
Machine bolts	60
Carriage bolts	60
Coach or lag screws.....	60
Hot-pressed nuts, squares, tapped or blank..	60
Hot-pressed nuts, hexagons, tapped or blank.	60
No. 8 black annealed wire, per 100 lb.....	\$3.20
Common wire nails, base per keg..	\$2.85 to 2.95
Cement coated nails, base per keg.....	2.95

New York

Pig Iron More Active—Sheet Prices Tested by 2000-Ton Inquiry

NEW YORK, June 19.—More interest is being shown in pig iron for forward delivery, although it cannot be said that a real buying movement has developed. The New York Air Brake Co., New York, has bought against an inquiry for 1200 tons of malleable and 500 tons of foundry for fourth quarter and 500 tons of foundry for the current quarter, placing part of the business with Buffalo producers. The General Fire Extinguisher Co., Providence, R. I., has also closed for 2000 tons of foundry for fourth quarter. The Eastern Malleable Iron Co., Naugatuck, Conn., has issued an inquiry for 2500 tons of malleable for the fourth quarter. These evidences of interest in pig iron for delivery next quarter come at a time when foundry melt generally is declining either on account of decreased bookings or hot weather, or both. A belief that pig iron prices have got so low that they cannot decline much further and a feeling that the coal strike may finally prove a strengthening factor in the iron market are both regarded as possible motives for forward buying at this time. The general run of the foundry trade, however, is still adhering to a hand-to-mouth buying policy. Pig iron prices show little change. Eastern Pennsylvania foundry iron is more generally available at \$20, base furnace, and Buffalo foundry iron, although holding to \$17, base furnace, in most cases, has dipped to \$16.75 on large sales. Sales of pig iron by local brokers during the past week totaled 6000 tons.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail).....	\$21.91 to \$22.41
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn).....	19.50 to 20.00
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	21.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	22.39 to 23.52

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

Finished Steel.—New business is at a slightly better rate than during the first week or 10 days of the month, but there is no evidence of a general upturn in demand. Orders are somewhat behind June figures. What promises to be a definite test of sheet prices established early in May is offered by an inquiry from a steel barrel manufacturer in the metropolitan district for 1000 tons of black sheets and 1000 tons of blue annealed sheets. The prospective buyer is said to have offered the tonnage of black sheets to one mill at 2.90c., Pittsburgh, but producers have been unwilling to meet this price, and the evidence at hand seems to indicate that bids were uniformly 3c. on black sheets and 2.25c. on blue annealed. Galvanized sheets are being held at 3.85c., Pittsburgh, while manufacturers of hot and cold rolled strip steel are offering strong resistance to efforts of consumers to obtain concessions on these products. Before the end of the month the last of the second quarter specifications on sheets and strips probably will have been completed, and the interest of buyers in the stability of the new prices is quite marked. Producers also are watching the market closely and are giving careful scrutiny to all rumors of concessions. Steel bars are now steadier at 1.80c. to 1.85c., Pittsburgh, the former price applying on larger lots. In plates and shapes, however, quotations are still somewhat irregular. Some of the plate mills are adhering more rigidly to 1.80c., Pittsburgh, on ordinary lots, but concessions of \$1 a ton are obtainable on the more desirable tonnages. Mixed car lots of structural shapes are being quoted at 1.75c., Pittsburgh, with larger lots at 1.70c., while on the building projects of unusual size even lower prices are ruling. The new quotation on wire nails of \$2.55, Pittsburgh, per 100-lb. keg, is still largely an asking price, as consumers and jobbers are well covered at \$2.50, and one or two makers are still quoting the lower figure on current business. Demand for butt-weld pipe

is keeping up at a better rate than is usual at this time of year, but this is accountable to the delay of the spring buying movement, brought about by labor troubles and bad weather. Competition for business and price weakness on alloy steels in the Detroit district are reflected here, although buying is at a minimum. Structural steel inquiries include 6000 tons for a New York bank building, while 6500 tons for a Brooklyn bank building was awarded.

Mill prices per lb. delivered New York: Soft steel bars, 2.14c. to 2.24c.; plates, 2.09c. to 2.19c.; structural shapes, 1.99c. to 2.14c.; bar iron, 2.14c.

Reinforcing Bars.—The Concrete Steel Co. will furnish 800 tons of reinforcing steel for a boulevard on Long Island. An automobile service building in Manhattan will require about 1150 tons. Several fair-sized

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.34c.
Soft steel bars and small shapes.....	3.24c.
Iron bars.....	3.24c.
Iron bars, Swedish charcoal.....	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons.....	4.00c.
Flats and squares.....	4.50c.
Cold-rolled strip, soft and quarter hard..	5.75c.
Hoops.....	4.49c.
Bands.....	3.99c.
Blue annealed sheets (No. 10 gage).....	3.89c.
Long terne sheets (No. 24 gage).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galvanized annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger.....	3.65c.
Open-hearth spring steel, bases...4.50c. to 7.00c.	
Machine bolts, cut thread: Per Cent Off List	
¾ x 6 in. and smaller.....	50 to 50 and 10
1 x 30 in. and smaller.....	45 to 50
Carriage bolts, cut thread:	
½ x 6 in. and smaller.....	50 and 10 to 60
¾ x 20 in. and smaller.....	50 to 50 and 5
Coach screws:	
½ x 6 in. and smaller.....	50 and 10 to 60
1 x 16 in. and smaller.....	50 to 50 and 5
Boiler Tubes— Per 100 Ft.	
Lap welded steel, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.00
Charcoal iron, 4-in.....	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
¼-in. butt.....	46	29
¾-in. butt.....	51	37
1½-in. butt.....	53	39
2½-6-in. lap.....	48	35
7 and 8-in. lap.....	44	17
11 and 12-in. lap.....	37	12
Wrought Iron—		
¼-in. butt.....	4	+19
¾-in. butt.....	11	+9
1-1½-in. butt.....	14	+6
2-in. lap.....	5	+14
3-6-in. lap.....	11	+6
7-12-in. lap.....	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box.....	\$6.45	\$6.20
Charcoal, per box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20.....	4.00c.
No. 22.....	4.15c.
No. 24.....	4.20c.
No. 26.....	4.30c.
No. 28*.....	4.45c.
No. 30.....	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14.....	4.35c. to 4.60c.
No. 16.....	4.45c. to 4.70c.
No. 18.....	4.60c.
No. 20.....	4.75c.
No. 22.....	4.80c.
No. 24.....	4.95c.
No. 26.....	5.20c.
No. 28*.....	5.45c.
No. 30.....	5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

jobs have been placed during the week, and considerable new work is coming out for bids. July business seems likely to be ahead of June bookings, at least from the standpoint of tonnage taken. There is no change in prices.

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.05c. to 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Warehouse Business.—As the month has progressed there has been a gradual curtailment of the volume of orders for material from stock, so that July will probably show a smaller total business than June. Prices, however, are evidently being fairly well maintained, although small concessions on black and galvanized sheets are occasionally reported. Purchasing of structural material continues, but orders are not numerous and are confined to small lots to complete current contracts.

Cast Iron Pipe.—Prices show a further recession under keen competition for the small volume of current business. Southern makers are active in seeking tonnages in the North, and this situation has brought out prices as low as \$33 per ton, base Birmingham. While most of the present orders are from private companies, there are occasional public lettings of small tonnages of pipe. Montclair, N. J., recently opened bids on about 125 tons of water pipe, and the National Cast Iron Pipe Co., Birmingham, was low bidder. Contractors' bids were opened last week by White Plains, N. Y., on a contract calling for about 2500 tons. The Department of Water Supply, Gas and Electricity, New York, will open contractors' bids July 26 on a small tonnage of pipe. The Metropolitan Commission of Boston opened bids July 15 on 1000 tons of 20-in. pipe.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, \$42.25 to \$44.25; 4-in. and 5-in., \$47.25 to \$49.25; 3-in., \$57.25 to \$59.25; Class A and gas pipe, \$4 to \$5 extra.

Old Material.—The downward tendency of prices is still evident on some grades, but in most cases the market is quiet and unchanged. No. 1 heavy melting steel is still being purchased at \$13.50 per ton, delivered eastern Pennsylvania. Borings and turnings and short shoveling turnings are inactive, with about the only shipments going to Bethlehem, Pa. A broker with a contract for delivery of blast furnace material to a Steelton, Pa., consumer is not buying at present. For Bethlehem delivery \$10.25 per ton is still being quoted. Chemical borings are still being shipped to Gibbstown and Bound Brook, N. J., at \$15.25 per ton, delivered, for the former and \$14.75 per ton, delivered, for the latter. Turnings are quoted at \$10.50 per ton, delivered Phoenixville, Pa., and heavy breakable cast is being purchased at \$14.50 per ton, delivered to a Harrisburg, Pa., consumer, and at \$15.50 per ton, delivered to Florence, N. J.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel.....	\$10.00 to \$10.85
Heavy melting steel (yard).....	6.75 to 7.00
No. 1 heavy breakable cast.....	10.75 to 12.50
Stove plate (steel works).....	8.00 to 8.50
Locomotive grate bars.....	8.00 to 8.50
Machine shop turnings.....	6.00 to 6.50
Short shoveling turnings.....	7.00 to 7.50
Cast borings (blast furnace or steel works).....	7.00 to 7.50
Mixed borings and turnings.....	7.00 to 7.50
Steel car axles.....	15.75 to 16.25
Iron car axles (nom.).....	23.00 to 23.50
Iron and steel pipe (1 in diam., not under 2 ft. long).....	8.25 to 8.75
Forge fire.....	6.50 to 7.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought, long.....	10.50 to 11.00
Rails for rolling.....	10.50 to 11.00
Cast iron carwheels.....	10.75 to 11.25
Stove plate (foundry).....	8.50 to 9.75
Malleable cast (railroad).....	10.75 to 11.25
Cast borings (chemical).....	11.75 to 12.75

Prices per gross ton, delivered local foundries:

No. 1 machinery cast.....	\$14.00 to \$14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.).....	11.50 to 12.00

Coke.—Prices have developed further softness in the past week, so that the present market is not quotable at better than \$4 to \$4.50 per net ton, Connellsville, for prompt shipment foundry coke and about \$3.25 per ton, Connellsville, for standard furnace coke. Even lower prices are reported to have been named

in a few cases on distress carloads. Delivered prices of Connellsville foundry coke are: To northern New Jersey, \$8.03 to \$8.53; New York or Brooklyn, \$8.79 to \$9.29; Newark or Jersey City, N. J., \$7.91 to \$8.41 per net ton. By-product foundry coke is unchanged at \$9.59 to \$10.77 per net ton, delivered Newark or Jersey City.

Cleveland

Local Mill to Ship Scrap from Detroit by Water—Heavier Pig Iron Sales

CLEVELAND, July 19.—New demand for finished steel in all its forms continues light. Mills are getting a fair number of orders for steel bars, plates and structural material, with business well scattered among the various consuming industries, but the orders are for very small lots for early needs. While consuming plants as a rule are not very busy, no further reduction of operations is reported. Local finishing mill capacity is being increased by the starting up this week by the Bourne-Fuller Co. of a new semi-continuous 10-in. mill at its Union Works. Both carbon and alloy steel bars will be produced on this mill.

The use of Lake transportation in the steel industry is being increased by the placing in commission by the Otis Steel Co. of a small Lake freighter for shipping its products to Detroit. The first water cargo was shipped a few days ago, and the Otis company has purchased a round tonnage of steel-making scrap in Detroit, which will be hauled on the return trips.

The Ford Motor Co., Detroit, yesterday placed some moderate-sized orders for steel for its new car models, on which it is understood production will start in a limited way Aug. 1. Orders for steel from the automotive industry in Michigan are very light in the aggregate. The curtailment of demand from this source appears to be sharper than the reduction in production schedules, indicating that motor car manufacturers are cutting their stocks to a minimum.

Inquiry for structural steel in the building field is less active than recently. A large tonnage will be required for a Chesapeake & Ohio bridge over the Ohio River, and an inquiry has come out for 4000 tons for approaches for this structure. Competition is still unusually keen among fabricators, and prices below \$60 a ton for fabricated material delivered on the job are reported.

Mill prices are holding steady, with little evidence of pressure for concessions on the small lots that are moving. Steel bars range from 1.80c. to 1.85c., Pittsburgh, mills getting the higher price for small lots. While there is the same spread on plates and structural material, the lower price is more common on these. Local mills quote steel bars at 1.80c. to 1.85c., Cleveland.

Pig Iron.—The market is fairly active, but most of the business taken the past week was in Michigan, Indiana and western New York. Cleveland interests sold 45,000 tons during the week, nearly all for the third quarter. While there were a few round-lot orders, most of the business was in small lots. Competition is unusually keen and has resulted in increased price irregularities in the outside territories. In Michigan the market has declined 50c. a ton to \$18.50, furnace, as a ruling quotation, although the latter price had previously appeared in some spots. The decline in Michi-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing steel bars.....	2.25c. to 3.00c.
Cold-finished rounds and hexagons.....	3.65c.
Cold-finished flats and squares.....	4.15c.
Hoops and bands.....	3.65c.
Cold-rolled strip.....	*5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.65c.
Blue annealed sheets (No. 10).....	3.25c.
No. 9 annealed wire, per 100 lb.....	\$2.90
No. 9 galvanized wire, per 100 lb.....	3.35
Common wire nails, base, per keg.....	2.90

*Net base, including boxing and cutting to length.

gan is attributed to the competition of Cleveland furnaces. Furnaces situated geographically to serve that territory and having a freight advantage aim to put their prices on a basis that will shut out competition from more distant stacks. The openly quoted Cleveland price for outside shipment is \$17.50, furnace. However, this price is being named for shipment to nearby non-competitive points and for some of the competitive points in the outlying districts Cleveland furnaces are going as low as \$17. One factor that evidently is making the market more irregular at the present time than recently is the excess production of some producers that has resulted from the slowing down in shipping orders caused by curtailed foundry operations. With some of their shipments held up, producers are seeking other outlets for their iron. Some have succeeded to the extent that their July shipments will fall but slightly below those of June. For Cleveland delivery the market is unchanged at \$18.50, furnace. Sales during the week included 6000 tons of malleable iron purchased by a Muncie, Ind., melter for its Muncie, and Benton Harbor, Mich., plants.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25.....	\$19.00
Southern fdy., sil. 1.75 to 2.25.....	23.25
Malleable	19.00
Ohio silvery, 8 per cent.....	31.50
Basic, Valley furnace.....	17.50
Standard low phos., Valley fur.....	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—The consumption of Lake Superior ore during June amounted to 4,530,565 tons, a decrease for the month of 482,217 tons. The amount used in June, last year, was 4,834,126 tons. Ore stocks show a considerable increase over a year ago. The amount on hand at furnaces and Lake Erie docks July 1 was 26,972,595 tons, as compared with 21,511,988 tons on the same date a year ago. There were 167 furnaces in blast using Lake Erie ore June 30, a decrease of 10 during the month.

Semi-Finished Steel.—Some consumers in this territory have been able to buy sheet bars at \$33.50, Cleveland, although the market is nominally \$34. Billets and slabs are unchanged at \$33. Specifications are lighter than earlier in the month.

Sheets.—There is not much new demand, and mills have little business on their books. The automotive industry is ordering in very small quantities. A Cleveland consumer during the week purchased 550 tons of blue annealed sheets for the manufacture of mail boxes for the Post Office Department. Prices are being firmly maintained in spite of the inactivity.

Strip Steel.—There is very little demand for hot-rolled strip steel, and mills have little business on their books. Cold-rolled strip mills are getting a fair volume of new business in small lots, and this, with specifications against contracts, is keeping them moderately busy. Mills are holding tightly to ruling prices.

Reinforcing Bars.—New inquiry is limited to lots of less than 100 tons, for which there is a fair demand. Rail steel bar prices are unchanged at 1.65c., mill, for car lots.

Warehouse Business.—Plates, shapes and bars are in light demand, but are moving in about the same volume as last month. The demand for sheets, which showed a spurt earlier in the month, has slowed down. Prices are being well maintained.

Bolts, Nuts and Rivets.—Makers are getting a rather light volume of bolt and nut orders from the automotive industry and other consumers and from jobbers, with buyers placing only small lots. The market is firm. July business will fall somewhat below that of June. The industry is now operating at about 55 per cent of capacity. The call for rivets is slow, but regular prices are being maintained. Few small-lot consumers of large rivets took advantage of the opportunity to contract at the regular price of \$2.75 before July 15, the expiration of the date fixed for accepting contracts, and those that have not contracted will be charged \$3.

Coke.—Foundries having contracts are taking fair shipments, but there is very little new demand. Prices

are unchanged at \$4.25 to \$5.35, ovens, for standard Connellsville foundry coke, the top price being for premium grades. Foundry heating coke is irregular, ranging from \$2.40 to \$3, ovens, for prompt shipment.

Old Material.—The Otis Steel Co., Cleveland, during the week purchased 30,000 tons of heavy melting steel, one-half of which was bought in Detroit and will be shipped to Cleveland by water. The remainder was purchased in Cleveland. Both lots were bought from brokers. This will be the first Detroit scrap to be shipped to Cleveland by water and the first water shipment of scrap to be made to this city, at least in any sizable lots. The bulk of the steel-making scrap in Detroit since the opening of the season of navigation has been shipped by water to a Buffalo mill. The purchase includes both Nos. 1 and 2 grades, the average price having been \$14.25 for No. 1 heavy melting steel. Both sellers have already purchased the greater part of the scrap covered by these orders, the Cleveland broker having paid \$14 to \$14.10. These purchases had little effect on prices in the Cleveland market, for the firmer tone they might be expected to give the market was offset by the fact that the consumer probably will not come in the market again for steel-making scrap for three months. Dealers are able to buy small lots of heavy melting steel at \$13.75. There is a limited amount of activity in blast furnace scrap, for which dealers are paying \$10.50 for good lots, although they are able to buy small lots at \$10.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades

No. 1 heavy melting steel.....	\$13.75 to \$14.00
No. 2 heavy melting steel.....	13.25 to 13.50
Compressed sheet steel.....	13.00 to 13.25
Light bundled sheet stampings.....	11.50 to 12.00
Drop forge flashings.....	12.50 to 13.00
Machine shop turnings.....	9.25 to 9.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 2 railroad wrought.....	13.75 to 14.00
No. 1 busheling.....	11.50 to 11.75
Pipes and flues.....	10.00 to 10.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades

Low phosphorus forging crops.....	16.50 to 17.00
Low phosphorus, billet bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops.....	16.00 to 16.50
Low phosphorus plate scrap.....	16.00 to 16.50

Blast Furnace Grades

Cast iron borings.....	10.25 to 10.50
Mixed borings and short turnings.....	10.25 to 10.50
No. 2 busheling.....	10.25 to 10.50

Cupola Grades

No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.....	18.00 to 18.50

Miscellaneous

Railroad malleable	15.50 to 16.00
Rails for rolling.....	16.25 to 16.50

Philadelphia

Pig Iron Prices Affected by Competition of New York State Furnaces

PHILADELPHIA, July 19.—A slight easing off in prices of eastern Pennsylvania foundry pig iron, due

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.....	2.80c. to 3.00c.
Plates, ⅜-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands).....	2.70c. to 3.20c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.....	3.50c.
Round-edge steel, planished.....	4.30c.
Reinforcing steel bars, square, twisted and deformed.....	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅞-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24).....	4.35c.
Galvanized sheets (No. 24).....	5.20c.
Blue annealed sheets (No. 10)...	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars.....	6.60c.

largely to competition of New York State furnaces; more buying interest among consumers of steel, and a stronger undertone in the scrap market, despite some low-priced sales during the past week, are the somewhat conflicting factors in the iron and steel market situation in this district.

Comment as to a quickening of interest among steel consumers requires the explanation that nothing approaching a real upturn in buying has developed; in fact, the volume for this month probably will fall below that of June. But the representatives of the mills seem to detect more confidence among buyers that prices will not go lower, while on some products, notably sheets, strip steel and steel bars, the resistance of sellers to price concessions is noticeably strong.

Except for heavy melting steel, of which there seems to be a marked surplus, the supply of various grades of scrap is declining. Some mills have not been able to obtain sufficient quantities against old contracts, many shippers declining to sell at prices which yield them no profit.

Pig Iron.—The most severe test the eastern Pennsylvania foundry iron market has had in recent weeks was through the purchase of 1500 tons by the J. L. Mott Iron Works, Trenton, N. J. Competition of New York State furnaces has become keener in this district, and on some of the larger orders one or two sellers of this district have found it necessary to go to \$20, furnace, to get orders, and in at least one instance the differential for higher silicon iron was waived, a practice that some of the New York furnaces had instituted. The market can by no means be described as active, but there has been a little better business for some producers, particularly for a furnace which will soon go out for relining and which has solicited orders to carry its customers through the time it will be out of blast. On small-lot business the usual quotations for foundry iron are on the basis of \$20.50, furnace.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.76 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 21.76
East. Pa. No. 1X, 2.25 to 2.75 sil.	21.76 to 22.26
Basic (delivered eastern Pa.)	20.75
Gray forge	21.00 to 21.50
Malleable	21.50 to 22.00
Standard low phos. (f.o.b. New York State furnace)	25.00
Copper bearing low phos. (f.o.b. furnace)	24.50 to 25.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	26.67
Virginia No. 2X, 2.25 to 2.75 sil.	27.17

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$5.17 from Virginia furnaces.

Billets.—Only one sale of rerolling billets is reported, a lot of about 200 tons for which \$34, Pittsburgh, was paid. Forging billets are regularly quoted at \$40, Pittsburgh.

Plates.—In the past week the orders for plates have been more numerous, but the total tonnage for the month so far probably falls short of June business for a like period. Some mills are holding for 1.80c., Pittsburgh, on miscellaneous business. As many of the current orders are for only a carload or less, the market has not been seriously affected by the occasional sales at 1.75c., Pittsburgh. With desirable rollings rather scarce, it probably is not surprising that on 200 tons of plates wider than 72-in. a mill quoted 1.75c. and waived the extra.

Structural Shapes.—Miscellaneous orders for stock requirements and for small building jobs have brought up the total tonnage of shapes in the past week, compared with the two preceding weeks, but taking a broad view this market does not present a very favorable outlook for the next month or so, due to the lack of sizable projects. Bids were opened today (Tuesday) on another section of the Broad Street subway, the low bidder on the general contract being Hyman & Goodman, New York. The steel requirements are about 6000 tons, but no award has been announced. Mixed car lots and smaller orders for shapes are being filled at 1.75c. or 1.80c., Pittsburgh, but on the larger orders prices are still \$2 to \$4 a ton below the maximum figure.

Bars.—The steel market seems to have reached a point of stability in price, notwithstanding the anxiety of producers for tonnage. Quotations are 1.80c., Pitts-

burgh, for the larger lots and 1.85c. for small lots. With consumers and jobbers limiting their orders usually to not more than a carload, the quotations have not been severely tested, but some mills have notified their sales representatives not to go below 1.80c. on any business.

Sheets and Strips.—Hang-over specifications against second quarter sheet contracts still appear on the order books of the mills, but this business is rapidly being cleaned up and a preponderance of the orders entered is on the basis of the new prices, namely 2.25c. for blue annealed, 3c. for black and 3.85c. for galvanized, Pittsburgh base. Producers are watching the price situation as keenly as buyers. Because of the large number of sheet mills which quote on every worth-while inquiry rumors have become current of price concessions, but careful investigation by sellers themselves has failed to reveal any confirmation. A similar situation exists with regard to hot and cold-rolled strip steel, all authentic reports pointing to a maintenance of published prices.

Imports.—There were no receipts of pig iron from abroad at Philadelphia last week and imports of steel were light, consisting of 51 tons of bars from Germany, 38 tons from Sweden and 36 tons from France, and 35 tons of structural shapes from Belgium and 8 tons from France.

Old Material.—Despite the fact that there were some sales of scrap at low prices within the past week, conditions in the making seem to point to a stronger market. There is a surplus of heavy melting steel, but in some other grades there are clear indications of fewer offerings and restriction of shipments, due, of course, to the prevailing low prices, which leave no profit for yard dealers and such a small net for manufacturing producers that both classes are indifferent as to making sales. A case in point is stove plate, which is used to a considerable extent by two steel companies and by some foundries in this district. Much of the stove plate is gathered by local dealers, who purchase it from junkmen who pick it up by horse and wagon or truck. The price which can be realized for it today is so little that it does not pay to gather it, and consequently the supply has been growing less. A steel company which has depended on stove plate and grate bars for a part of its scrap mixture has recently had to buy larger quantities of heavy melting steel and heavy breakable cast to take their place. Heavy melting steel was sold a few days ago to a nearby steel plant at \$13, delivered, but the material originated near Philadelphia and the freight rate was low. For delivery at points farther away, brokers have quoted \$14. A fair range for the market, therefore, is \$13 to \$14, with the probability that the lower price may not be duplicated. Other grades which have shown weakness are No. 1 railroad wrought, cast borings, couplers and knuckles, rolled steel wheels and No. 1 forge fire. Stove plate has been sold at \$12 and \$12.50, but some brokers are asking \$13. A feature of the market which points to at least a slight recovery is the difficulty brokers are having in filling old contracts. In some cases they have had to pay more than the price written in their contracts in order to obtain material for their regular customers.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$13.00 to \$14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.50 to 12.00
No. 1 railroad wrought	15.50 to 16.00
Bundled sheets (for steel works)	10.00 to 10.50
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	15.50 to 16.00
Rolling mill wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	10.50 to 11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50
Shafting	18.00 to 18.50
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00
Steel rails for rolling	16.00
Cast iron carwheels	15.00 to 15.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 16.00

San Francisco

Heavier Buying of Fabricated Steel— Low Quotations on Foreign Material

SAN FRANCISCO, July 16 (*By Air Mail*).—Of interest in a week of small buying in nearly all departments of the market, except fabricated steel, has been a new low quotation on foreign structural material, which is understood to have been offered during the week at 1.60c., c.i.f., duty paid, San Francisco. A similar quotation has been made on reinforcing bars. The last low quotation on foreign shapes and bars was about 1.70c. While it has not been unusual, lately, for shapes and bars of Belgian origin to be offered here at 1.75c., the quotation of 1.60c. is the lowest that is known to have been made on foreign material this year. A fairly large amount of foreign steel has come in at this port recently, and importers, apparently, are anxious to move their stocks.

The pending advance of \$3 a ton in ocean freight rates on steel shipped from Atlantic ports via the Panama Canal to the Pacific Coast, which becomes effective Aug. 1, has been a subject of comment during the past week. Whether the Eastern mills will change their quotations on the heavier forms of steel in consequence of the current advance in ocean freight rates is not yet known. Most of the mills, apparently, are waiting to see what action the leading interest will take.

Pig Iron.—This department of the market is very quiet. Sales during the week have been for immediate requirements only, and these have been conspicuously light in tonnage. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....\$25.00 to \$26.00
*Utah foundry, sil. 2.75 to 3.25	..... 25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	..... 25.00
**German foundry, sil. 2.75 to 3.25	..... 24.25

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings of fabricated structural steel during the week total about 2200 tons; fresh inquiries call for 5100 tons. The largest individual award, 625 tons for a city hall building in San Pedro, Cal., was taken by the Union Iron Works of Los Angeles. The largest individual inquiry, 2000 tons, is for a plant for the Ford Motor Co. in Los Angeles. A plant for the Goodrich Rubber Co. in Los Angeles calls for about 1400 tons, and a Y. M. C. A. building in San Francisco will require 800 tons. While Eastern mills continue to quote plain material at 2.3c., c.i.f. Coast ports, foreign material is quotable at 1.65c. to 1.75c., c.i.f., duty paid, San Francisco. Fabricators' prices both locally and in Los Angeles are much lower than they have been in over a year.

Plates.—Lettings during the week total 1200 tons, but nothing of importance has come up for bids. The largest individual award, 900 tons for the Southern Pacific Co., San Francisco, was placed with an unnamed Eastern mill. The Standard Oil Co. of California, San Francisco, also placed 150 tons of plates with an Eastern producer. Eastern mills continue to quote plates at 2.30c., c.i.f. Coast ports, although some business is known to have been closed recently at 2.25c.

Bars.—An apartment building in Seattle, Wash., took 700 tons of reinforcing bars, and 260 tons for a garage in Los Angeles was placed during the week. These were the two largest lettings. In San Francisco a theater will require about 200 tons, on which bids will close Aug. 20. The East Bay Municipal Utility

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.10c.
Small angles, $\frac{3}{8}$ -in. and over	3.10c.
Small angles, under $\frac{3}{8}$ -in.	3.60c.
Small channels and tees, $\frac{3}{8}$ -in. to 2 $\frac{3}{4}$ -in.	3.70c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.10c.
Black sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.85c.
Galvanized sheets (No. 24)	5.95c.
Rivets	5.50c.
Common wire nails, base per keg	\$3.45
Cement coated nails, 100-lb. keg	3.45

District, Oakland, Cal., is expected to award about 400 tons during the next week or 10 days. While local jobbers' quotations on concrete bars are unchanged at 2.75c. to 2.85c., base, per lb. on lots of 200 tons, and 3c. to 3.10c., base, on less-than-carload lots, lower quotations are known to have been made recently on account of the competition of foreign steel and also because the present situation is what is known as a buyers' market.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has been awarded 181 tons of 14-in. pipe by the La Mesa Lemon Grove and Spring Valley Irrigation District, La Mesa, Cal., and the National Cast Iron Pipe Co. has taken 100 tons of 12-in. Class C pipe for the city of Glendale, Cal. The United States Cast Iron Pipe & Foundry Co. is low bidder on 361 tons of cast iron pipe for the city of San Bernardino, Cal.

Warehouse Business.—A readjustment in prices has been made recently by local jobbers. Revised quotations are given below.

Coke.—The market is sluggish, and sales during the week have been confined to relatively small tonnages. Local importers quote as follows:

English beehive coke, \$16 to \$17 per net ton at incoming dock; English by-product, \$12 to \$13, and German by-product, \$11.50 to \$12.

Toronto

Buy Pig Iron for Water Delivery— Steel Mill Operations High

TORONTO, ONT., July 19.—Improvement in spot sales has featured the Canadian pig iron market during the past few days. Melters who adhere to this method of buying have but limited supplies on hand and consequently are under the necessity of entering the market at frequent intervals. Orders for 50 to 200 tons were fairly numerous during the week, while some purchases called for as much as 500 to 600 tons. The latter tonnages were bought by some of the larger consumers who are taking water delivery of iron for stock instead of placing long term contracts, which would necessitate rail shipments when water routes are closed. Melters are showing little interest in the market in connection with future contracts. Most of those who do place contracts are covered for this quarter. Orders against contracts are appearing at regular intervals and the movement of foundry and malleable iron between producers and consumers is active. Taken as a whole the daily melt remains high, averaging more than 75 per cent. Pig iron prices remain unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	.....\$24.10
No. 2 foundry, sil. 1.75 to 2.25	..... 24.10
Malleable	..... 24.10

Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	..... 26.50
No. 2 foundry, sil. 1.75 to 2.25	..... 26.50
Malleable	..... 26.50
Basic	..... 25.50

Imported Iron at Montreal Warehouse	
Summerlee	..... 36.00
Carron	..... 36.00

Rails.—The Dominion Iron & Steel Corporation, Sydney, N. S., has completed its rail order for the Newfoundland Government and started on the 10,000-ton order for the Canadian Pacific Railway this week. Other rail orders from both the Canadian Pacific and Canadian National railroads are expected in the course of the next month or six weeks. Some railroad equipment purchases have been made during the past few days, but the majority of the orders were small. The general outlook in the iron and steel industry of Canada is better today than it has been for several years. Practically all Canadian mills have been operating on a near capacity basis since the first of the year, and with orders on hand and in prospect it is believed this rate will continue for some time longer.

Old Material.—The market is listless in both the Toronto and Montreal districts, with dealers reporting a demand bordering on stagnation. The consumption of old material, however, continues high, but the majority of users have sufficient stocks on hand to carry them through the rest of this month and as a conse-

quence are not showing more than passing interest in fresh supplies. The softening tendency that appears to be gaining headway is also affecting business, despite the fact that dealers have made no revision in prices. It is generally understood that consumers have the market pretty well in their own hands and can almost make their own prices. This places dealers in a position where they are very little interested in making sales, especially with the small margin of profit that is available. The export demand continues unchanged, and until business across the international boundary picks up there is little prospect of a turn for the better.

Dealers' buying prices:

	Toronto	Montreal
<i>Per Gross Ton</i>		
Heavy melting steel.....	\$10.50	\$9.00
Rails, scrap	11.00	10.00
No. 1 wrought	11.00	14.00
Machine shop turnings.....	8.00	7.50
Boiler plate	8.00	8.00
Heavy axle turnings.....	8.50	8.50
Cast borings.....	8.50	7.50
Steel turnings	8.00	8.00
Wrought pipe	6.00	6.00
Steel axles	15.00	17.00
Axles, wrought iron	17.00	19.00
<i>Per Net Ton</i>		
No. 1 machinery cast	16.00	18.00
Stove plate	10.00	13.00
Standard carwheels	14.00	16.00
Malleable scrap	14.00	14.00

Birmingham

Pig Iron Demand Light—Sheets Advance—Texas & Pacific Buys Rails

BIRMINGHAM, July 19.—Active buying of pig iron has not yet followed the price reduction of a week ago. Consumers are reducing their operations and are limiting purchases of pig iron to known requirements in the next 60 days, in no case placing orders for fourth quarter delivery. Very little demand for iron has developed from points outside of this territory. Although it is believed that buying will cover the output of furnaces for the current quarter, consideration is being given to further curtailment of production. At present 11 furnaces are in blast on foundry iron, six are on basic, and two, on special brands.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil...	\$17.25 to \$17.50
No. 1 foundry, 2.25 to 2.75 sil...	17.75 to 18.00
Basic	17.25 to 17.50
Charcoal, warm blast	29.00

Rolled Steel.—There has been further curtailment of steel production, but mill improvements now being made reflect confidence in a revival of demand in the fall. The blooming mill engine which will be replaced at the Ensley works of the Tennessee Coal, Iron & Railroad Co. has been in service for 25 years. Orders recently placed by Southern railroads are of encouraging proportions. The Texas & Pacific Railway has placed 9000 tons of 110-lb. rails with the Tennessee company, supplementing an order for 41,000 tons of rails given to the same mill by the Southern Railway System two weeks ago. Other orders for rails, as well as accessories, are in prospect. Sheets are stronger, now bringing 2.40c., base Birmingham, for blue annealed, 3.15c. for black and 4c. for galvanized. Fabricating plants are booking numerous small struc-

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.35c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
<i>Per Cent Off List</i>	
Tank rivets, $\frac{7}{8}$ -in. and smaller.....	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped..	60
Hot-pressed nuts, hexagons, blank or tapped	60

tural contracts, as well as occasional orders calling for several hundred tons each.

Cast Iron Pipe.—Production of pressure pipe continues to decline and is no longer higher than 70 per cent of capacity, if that high. Prices are weak at \$34 to \$35, Birmingham, for 6-in. and larger diameters. Demand for soil pipe is lagging, although prices are not so weak as they have been. Output of soil pipe has been on a curtailed basis for some time.

Coke.—Foundry coke is moving in larger quantities to the Chicago and Detroit territories. By-product foundry coke continues to command \$5.50 per net ton, Birmingham, while the beehive product is bringing \$6. Independent coke producers expect to increase their output shortly.

Old Material.—Although a carload of scrap is moving here and there, the market on the whole is virtually at a standstill. Heavy melting steel is inactive, even though consumers can practically name their own price. The appended quotations are nominal.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	\$10.50 to \$11.00
Scrap steel rails	12.50 to 13.00
Short shoveling turnings.....	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought.....	11.00 to 12.00
Rails for rolling	13.00 to 14.00
No. 1 cast	14.00 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical.....	13.00 to 13.50

St. Louis

Price Cut Stimulates Sales of Southern Iron—Scrap More Active

ST. LOUIS, July 19.—The sale of a fair tonnage of Southern pig iron at the reduced price of \$17.25, Birmingham, is reported. The local maker's quotations are unchanged at \$20 to \$20.50, Granite City; its sales for the week totaled 3500 tons, the bulk of which went to a steel maker in the district. Chicago furnaces have made no sales of consequence in this market for some time. Pig iron is said to be moving more freely than earlier in the month, when shipments were suspended by some of the melters.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.....	\$20.00 to \$20.50
Northern No. 2 fdy., delivered	
St. Louis	22.16
Southern No. 2 fdy., delivered...	21.67
Northern malleable, delivered....	22.16
Northern basic, delivered.....	22.16

Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—Mill representatives report that specifications for plates, shapes and bars against third quarter contracts are coming in more freely, although very little new business is being placed. The Missouri Pacific Railroad has issued inquiries for its requirements for the last half of the year, which include 400 tons of 3/16-in. and heavier plates and approximately 105 tons of sheets. Generally, however, railroads are backward in inquiring for last half requirements. Warehouse business is slightly better.

Coke.—The market for coke is passing through the usual summer lull. Consumers are drawing from stocks on hand and are not disposed to place new orders for industrial grades. Very little domestic business is being placed.

Old Material.—Dealers are competing keenly for railroad and other offerings of old material to fill an order for 6000 tons of heavy melting steel and heavy shoveling steel placed by an East Side consumer for delivery within the next 60 days. Heavier dealer buying is also prompted by the belief that other consumers will be in the market shortly for sizable tonnages. The steel order was placed at the same prices that were paid by the purchaser 45 days ago. Railroad lists in-

clude: Rock Island, 9000 tons; Chesapeake & Ohio and Southern, 8500 tons each; Gulf Coast Lines, 1300 tons; Chicago, Milwaukee & St. Paul, 60 carloads; Nickel Plate, 38 carloads; Missouri Pacific, 27 carloads; Cotton Belt, 18 carloads.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel.....	\$11.00 to \$11.50
No. 1 locomotive tires.....	14.50 to 15.00
Heavy shoveling steel.....	11.00 to 11.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart.....	13.00 to 13.50
Railroad springs.....	13.75 to 14.25
Bundled sheets.....	8.50 to 9.00
No. 2 railroad wrought.....	11.00 to 11.50
No. 1 busheling.....	9.75 to 10.25
Cast iron borings.....	9.00 to 9.50
Iron rails.....	14.00 to 14.50
Itails for rolling.....	13.75 to 14.25
Machine shop turnings.....	6.75 to 7.25
Steel car axles.....	18.50 to 19.00
Iron car axles.....	23.00 to 23.50
Wrought iron bars and transoms.....	18.50 to 19.00
No. 1 railroad wrought.....	12.00 to 12.50
Steel rails, less than 3 ft.....	15.50 to 16.00
Steel angle bars.....	11.75 to 12.25
Cast iron carwheels.....	13.50 to 14.00
No. 1 machinery cast.....	16.00 to 16.50
Railroad malleable.....	12.00 to 12.50
No. 1 railroad cast.....	15.00 to 15.50
Agricultural malleable.....	11.50 to 12.00
Relaying rails, 60 lb. and under.....	20.50 to 23.50
Relaying rails, 70 lb. and over.....	26.50 to 29.00

Pacific Northwest

Steel Prices Uncertain Pending Advance in Ocean Rates—Steel Bookings Decline

SEATTLE, July 15 (*By Air Mail*).—There is much conjecture as to what success the water lines serving the Pacific Coast will have in securing the heavy advance in rates effective Aug. 1. For a long time the water rate on steel from Eastern seaboard points to Pacific Coast points has been 25c. per 100 lb., with some contracts in force at as low as 20c. An advance of \$3 per ton in carrying rates means that much per ton of steel, and whether the mills will absorb all of the advance, or only part of it, is a question of great current interest to the Pacific Coast users of steel that buy from the East. The water lines have been divided into three classes of boats, A, B and C, Class A comprising the fast boats, Class B the next fastest, and Class C the slow, or what are known as tramp, steamers. The boats in Class A will charge 40c. per 100 lb. on articles of iron or steel from Eastern points, and Classes B and C, 35c. The Steel Corporation has its own line of boats, and as all steel shipped to the Coast by the Eastern steel mills is sold at delivered prices, the only way that the Steel Corporation can show its recognition of higher rates is to advance its delivered prices on steel. As yet there have been no intimations as to what the corporation will do in the matter. It is recognized that the present is not an opportune time to try to raise prices, so that price developments after the first of the month will be of much interest. It is recognized, too, that to advance prices on domestic steel will be an invitation for foreign steel makers to compete more vigorously for the Coast trade.

The steel trade in the Pacific Northwest is quiet. Orders and inquiries in the first half of July showed a falling off as compared with first half of June. Prices, on the whole, are fairly well maintained, but if any very desirable tonnage should come up it is believed that present quoted prices would be shaded at least \$1 per ton. The prospect of higher delivered prices on steel after Aug. 1 is regarded as so remote that consumers continue to buy only for their immediate needs.

Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforcing bars.....	2.90c.
Angles, bar sizes.....	3.00c.
Angles, structural.....	3.00c.
Black sheets (No. 24).....	4.75c.
Galvanized sheets (No. 24).....	5.50c.
Blue annealed sheets (No. 10).....	4.00c.
Wire nails, base per keg.....	\$3.75
Cement coated nails, 100-lb. keg.....	3.75

Pig Iron.—The Utah maker is making deliveries of pig iron within two weeks to Pacific Coast points, and this is shutting out foreign iron, practically none having come into this market for a long time. Utah basic and No. 2 foundry are quoted at \$25 to \$26 per gross ton, delivered Seattle.

Plates.—The market is very quiet, and prices are soft. On two inquiries for plates, each for about 400 tons for use in making digesters for pulp mills, below 2.30c. is reported to have been quoted. A water line job at Astoria, Ore., calling for about 1500 tons, has been held up, and may not come up for bids for some time. Plates of tank quality, ¼ in. and heavier, are quoted at 2.30c., delivered Seattle, but this price would probably be shaded on attractive specifications.

Structural Shapes.—While a good deal of fabricating work is in sight, it is very slow in reaching the market. The Wallace Bridge & Structural Steel Co. has taken 175 tons for an addition to a local department store; the Lidgerwood Pacific Co. has been awarded 150 tons for an addition to the Deaf and Dumb Institute at Vancouver, Wash., and the Star Iron & Steel Co., Tacoma, has booked 250 tons for an addition to a smelter in that city. Work in sight includes 250 tons for a telephone building in Eugene, Ore.; a new 16 or 18-story building for the Elks in Seattle, of which the first six stories are to be of structural steel construction and the remainder of reinforced concrete; the local Great Northern Life building, estimated at 2000 tons, and the Auditorium, Seattle, requiring about the same amount of structural steel. Mill prices on structural shapes remain at 2.35c., c.i.f. Seattle.

Track Supplies.—The Edgewater Steel Co., Pittsburgh, has taken an order for 500 car wheels for the local street railroad lines.

Bars.—Prices on mild steel bars remain fairly firm at about 2.35c., delivered to the buyer, but this price is not any too strong. Local reinforcing steel bars range in price from 2c. to 2.15c., delivered, the price depending on the size and desirability of the order.

Sheets.—Demand continues very light, and there are reports of further shading in prices. Eastern mill quotations remain at 3.58c. for No. 24 black, 4.43½c. for No. 24 galvanized and 2.82½c. for No. 10 blue annealed, all c.i.f. Seattle.

Warehouse Business.—Local jobbers report that business in the first half of July showed a falling off as compared with the same period in June. It is understood that the mills have protected their local sales representatives for some time ahead against possible advances in steel prices following the increase in ocean rates effective Aug. 1.

Buffalo

More Inquiry for Pig Iron—Steel Output Down to 50 Per Cent

BUFFALO, July 19.—Pig iron inquiries for the week total 5000 to 7000 tons, with the principal one, 2000 to 2500 tons of foundry and malleable for the fourth quarter from the Massey-Harris Harvester Co., Batavia, N. Y. A good deal of business is being placed in small lots of around 200 and 300 tons. On some of this business furnaces are getting \$17.50, base, but on the larger inquiries \$17, and possibly better in rare instances, is being done. Some of the furnaces are disturbed over reports from the East that Buffalo makers are quoting below \$17, and assert that the rail rate was

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-finished flats, squares and hexagons.....	4.45c.
Rounds.....	3.95c.
Cold rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.30c.
Galvanized sheets (No. 24).....	5.15c.
Blue annealed sheets (No. 10).....	3.80c.
Common wire nails, base per keg.....	\$3.65
Black wire, base per 100 lb.....	3.90

used to figure this price instead of the barge canal rate, which should have been applied. One furnace is quoting \$17.50 on malleable for the fourth quarter. Very little inquiry for basic is coming up in this district. This grade is being quoted at \$17. One of the Donner Steel Co. stacks which is on basic is producing 700 tons a day.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25..	\$17.00 to \$17.50
No. 2X foundry, sil. 2.25 to 2.75..	17.50 to 18.00
No. 1X foundry, sil. 2.75 to 3.25..	18.50 to 19.00
Malleable, sil. up to 2.25.....	17.00 to 17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Open-hearth operations have been further curtailed, with the average around 50 per cent of capacity. The price situation is unchanged, though there is a growing feeling among the consumers that the bottom has been reached and some of the mill interests are looking for a buying wave. Large consumers can get 2.065c., Buffalo, on bars and shapes, with the smaller concerns paying 2.115c. to 2.165c. The sheet market is unusually firm, with 3c., base Pittsburgh, being quoted on black, 4.25c. on automobile body sheets, and 3.85c. on galvanized. Pipe is quiet, though some oil field tonnage for export has recently been placed. Prices on bolts are firm at 70 off. Bolt specifications are fair.

Old Material.—The market is unusually quiet, with the curtailment of open-hearth operations promising further inactivity in the scrap field. The only buying during the week has been by the dealers, and even this has been stopped, since one of the larger mills has temporarily suspended shipments.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$14.75 to \$15.00
No. 2 heavy melting steel.....	14.00 to 14.25
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets.....	12.75 to 13.25
Hand-bundled sheets	9.00 to 9.50
Drop force flashings	11.50 to 12.00
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings.....	12.75 to 13.25
Machine shop turnings	9.00 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers..	15.75 to 16.25
Railroad coil and leaf springs...	15.00 to 15.75
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings.....	12.75 to 13.25
Short shoveling steel turnings...	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings...	10.75 to 11.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	10.75 to 11.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	15.00 to 16.00
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast	14.25 to 14.75
Stove plate	13.00 to 13.50
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under.....	16.50 to 17.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Railroad	15.00 to 15.50
Agricultural	15.00 to 15.50
Industrial	15.00 to 15.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes...	3.40c.
Bars, soft steel or iron.....	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel.....	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10)...	3.60c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 annealed wire, per 100 lb.....	\$3.00
Common wire nails, base per keg.....	2.95
Cement coated nails, base 100 lb. keg...	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in.....	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.	39.00

Cincinnati

Low Prices Stimulate Pig Iron Buying —Heavy Melting Up 50c.

CINCINNATI, July 19.—Low prices put out recently by pig iron producers have stimulated buying, and bookings in the past week totaled more than 12,000 tons. About half of that amount was Southern iron, a considerable portion of which is for delivery to Louisville and Evansville. While the new price of \$17.25, base Birmingham, has not resulted in large purchases by melters in this territory, it has enabled consumers who like Southern iron in their mix to cover their needs at a price which compares favorably with that made by Northern furnaces. In an endeavor to secure business in southern Ohio and Indiana, Lake Erie sellers are quoting \$17, base furnace, a drop of 25c. a ton. A central Ohio furnace interest is meeting competition from both northern and southern Ohio by making prices which range from \$18.25 to \$19, base furnace, depending upon the point of delivery. Makers in the Ironton district report that they are refusing to accept orders under \$19, base furnace. Jackson County silvery iron is firm at \$28.50, base Jackson, for 8 per cent, but sales have been confined to single carloads. Among pending inquiries are 1500 tons of Northern foundry for the Monitor Stove Co., Cincinnati, 700 tons for the Wagner Mfg. Co., Sidney, Ohio, and 400 tons for the Richmond Malleable Iron Co., Richmond, Ind.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25....	\$20.89
So. Ohio malleable	\$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25....	20.94
Alabama fdy., sil. 2.25 to 2.75....	21.44
Tennessee fdy., sil. 1.75 to 2.25..	20.94
Southern Ohio silvery, 8 per cent	30.39

Freight rates: \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Following a period of dullness the market again is showing signs of a revival of buying on a moderate scale, with orders coming from widely diversified sources. The automobile industry has contributed in fair measure to the past week's bookings, several prominent motor car builders having requested early August delivery on substantial tonnages of sheets. Demand from the jobbing trade has been about normal, but mills are somewhat disappointed that warehouse stocks in the South have not been increased to care for the anticipated needs of the flooded area in the Mississippi Valley, in which the work of rehabilitation is getting under way. Some producers estimate that consumption in that district in the next few months will be doubled. The price situation is regarded as favorable. In sheets the only concessions that have been made recently have been in certain sections of the South where competition for the roofing trade has been especially keen. Otherwise, quotations are being maintained at 3c., base Pittsburgh, for black, 3.85c. for galvanized and 2.25c. for blue annealed. Mills are confident that this schedule will remain steady through July and August and that the normal fall requirements of consuming industries will further entrench their position. The bar market is quiet at 1.80c., base Pittsburgh, on attractive tonnages and at 1.85c. on single carload orders. Structural shapes and plates are unchanged at 1.80c., base Pittsburgh. Further strengthening in wire goods has developed. Common wire nails have been sold in Cincinnati at a delivered price of \$2.75 per keg. While local jobbers are receiving nails on old contracts at \$2.64, delivered, it is doubtful if that quotation can be obtained at present.

Warehouse Business.—In the first half of July sales fell slightly below those in the corresponding period in June. Orders for structural steel have been received at a surprisingly good rate, but activity in bars has declined sharply. Prices on all commodities are firm and unchanged.

Old Material.—An undertone of strength has developed in the past week, with the result that trading among dealers has increased. The Portsmouth, Ohio, works of the Wheeling Steel Corporation is reported to

have purchased a round tonnage of heavy melting steel at a delivered price of \$15.50. This sale, together with the feeling in the trade that an upturn in activity is near at hand, has been responsible for an advance of 50c. a ton in heavy melting steel, and other items have gone up 25c. to 50c. Railroad offerings in the past week are said to have brought slightly more than in June.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$12.00 to \$12.50
Scrap rails for melting.....	12.75 to 13.25
Loose sheet clippings.....	8.75 to 9.25
Champion bundled sheets.....	9.50 to 10.00
Cast iron borings.....	8.50 to 9.00
Machine shop turnings.....	7.50 to 8.00
No. 1 busheling.....	10.00 to 10.50
No. 2 busheling.....	7.00 to 7.50
Rails for rolling.....	13.50 to 14.00
No. 1 locomotive tires.....	14.25 to 14.75
No. 1 railroad wrought.....	11.75 to 12.25
Short rails.....	17.50 to 18.00
Cast iron carwheels.....	13.25 to 13.75
No. 1 machinery cast.....	17.50 to 18.50
No. 1 railroad cast.....	14.50 to 15.00
Burnt cast.....	8.50 to 9.00
Stove plate.....	10.00 to 10.50
Brake shoes.....	10.25 to 11.00
Railroad malleable.....	12.50 to 13.00
Agricultural malleable.....	12.00 to 12.50

Coke.—Interest among coke consumers is lagging, and specifications are smaller than in June. While a recession in activity is not uncommon at this time of the year, the decrease has been the most pronounced in several years. Despite the temporary lull in the market, prices on all grades are steady and unchanged.

Foundry coke prices per net ton, delivered Cincinnati: By-products coke, \$9.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.

Boston

Further Purchases of Pig Iron for Fourth Quarter—Cast Pipe Declines

BOSTON, July 19.—Furnaces east of Buffalo have taken additional fourth quarter business in pig iron, bookings in the past fortnight approximating 15,000 tons, mostly No. 2X and No. 1X with some No. 2 plain. Buffalo iron is now bringing \$17 a ton, base furnace, or \$21.91, delivered, and furnaces east of Buffalo are meeting that price or quoting lower, depending on the freight rate. In more than one instance they have sold No. 2X iron at \$21.50 a ton, delivered. It is intimated that delivery of some fourth quarter bookings will extend into 1928 unless the New England melt increases. Most business booked in the past week was by solicitation, there being little open inquiry of importance. One foundry, however, is inquiring for 1000 tons of No. 2X, and another for 600 tons of No. 2X. Buffalo, Alabama and western Pennsylvania irons are being sold, but in a small way.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25.....	\$21.91
Buffalo, sil. 2.25 to 2.75.....	\$21.91 to 22.41
East. Penn., sil. 1.75 to 2.25.....	23.65 to 24.15
East. Penn., sil. 2.25 to 2.75.....	24.15 to 24.65
Virginia, sil. 1.75 to 2.25.....	27.42
Virginia, sil. 2.25 to 2.75.....	27.92
Alabama, sil. 1.75 to 2.25.....	24.16 to 26.02
Alabama, sil. 2.25 to 2.75.....	24.66 to 26.52

Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.92 from Virginia, \$6.91 to \$8.77 from Alabama.

Cast Iron Pipe.—The Portland Construction Co. was the low bidder for a water system job, bids for which were opened Friday, July 15, by the Metropolitan District Commission, Boston. The Warren Foundry & Pipe Co. will furnish the 6800 ft. of 20-in. pipe required for the job. Portland, Me., has closed bids on 212 tons of 12-in. pipe, and Gardner, Mass., has taken tenders on 150 tons of smaller pipe. No awards have been announced. Pipe foundries have lowered their prices \$1 to \$2 a ton on 6, 8, 10 and 12-in. pipe, now being generally quoted at \$50.10 a ton, f.o.b. common Boston freight rate points. Concessions running as high as \$2 a ton have been named on 16-in. and larger pipe. The lower prices are based on cheaper pig iron.

Finished Material.—The market for steel mill products is firmer, and mills are booking more business. For standard shapes the market is pegged at 1.70c. per lb., base Pittsburgh, while special rollings are firm at 1.80c. On small orders, certain plate mills are obtaining 1.80c. per lb., base Pittsburgh, but the general run of business is at 1.75c., and 1.70c. can still be done. Bars are generally quoted at 1.75c. per lb., base Pittsburgh.

Coke.—Consumption of by-product foundry coke in New England fell off in the past week because many foundries were forced to suspend operations due to the excessive heat. Shipments by the New England Coal & Coke Co. and the Providence Gas Co., however, held up well, but showed no gain. These ovens continue to quote \$12 a ton delivered, within a \$3.10 freight rate zone. Good Connellsville foundry coke is offered at \$1 a ton less, but there are few takers.

Old Material.—Now that buying of yard steel for export to Italy at \$8.50 a ton on dock has ceased, the old material market appears less active. Recent bookings of this material have been made at \$6.50 to \$7 a ton, on cars shipping point, for shipment to Pennsylvania. Steel turnings at \$5.50 to \$5.75 a ton, on cars, mostly at \$5.60, figured in the past week's business, as well as chemical borings at \$10.50 to \$11. It is reported that no shipments will be made from New England against the recent purchase of heavy melting steel by the Bethlehem Steel Co. A local consumer has just bought steel turnings at \$7.50 a ton, delivered, and six carloads of sheared pipe at \$8 a ton, delivered. The American Steel & Wire Co., Worcester, Mass., and the Washburn Wire Co., Phillipsdale, R. I., have withdrawn from the market.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.00 to \$9.50
Scrap rails.....	8.00 to 8.50
No. 1 railroad wrought.....	10.00 to 10.50
No. 1 yard wrought.....	8.00 to 8.50
Machine shop turnings.....	5.50 to 5.75
Cast iron borings (steel works and rolling mill).....	5.50 to 6.00
Bundled skeleton, long.....	5.50 to 6.00
Forged flashings.....	6.00 to 6.50
Blast furnace borings and turnings.....	5.50 to 6.00
Forged scrap.....	5.00 to 5.50
Shafting.....	13.00 to 13.50
Street car axles.....	14.00 to 14.50
Wrought pipe (1 in. in diameter, over 2 ft. long).....	7.00 to 7.50
Rails for rerolling.....	10.00 to 10.50
Cast iron borings, chemical.....	10.50 to 11.00

Prices per gross ton delivered consumers' yards:

Textile cast.....	\$15.00 to \$15.50
No. 1 machinery cast.....	14.50 to 15.00
No. 2 machinery cast.....	12.50 to 13.00
Stove plate.....	12.00 to 12.50
Railroad malleable.....	14.50 to 15.00

Two gas mains of 16-in. steel pipe are to be carried over the Don River at Toronto, Canada, on the East York-Leaside Bridge. The order for more than a half mile of pipe, with fittings, was placed by the Consumers Gas Co. with the Semet-Solvay Engineering Corporation.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars and small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway, rounds.....	6.60c.
Norway, squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tire steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons.....	4.05c.
Squares and flats.....	4.55c.
Toe calk steel.....	6.00c.

NON-FERROUS METAL MARKETS

The Week's Prices		July 19	July 18	July 16	July 15	July 14	July 13
Cents per Pound for Early Delivery	Lake copper, N. Y.	12.75	12.62½	12.62½	12.62½	12.62½	12.62½
	Electrolytic copper, N. Y.* ..	12.50	12.37½	12.37½	12.37½	12.37½	12.37½
	Straits tin, spot, N. Y.	63.75	64.25	64.25	64.50	63.87½	63.75
	Lead, New York	6.20	6.20	6.20	6.20	6.20	6.20
	Lead, St. Louis	5.95	5.95	5.95	5.95	5.95	5.95
	Zinc, New York	6.52½	6.52½	6.52½	6.52½	6.52½	6.52½
	Zinc, St. Louis	6.17½	6.17½	6.17½	6.17½	6.17½	6.17½

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, July 19.—Copper is slightly stronger, following a period of fairly active buying, including a brisk foreign demand. Fair activity in tin has been accompanied by no marked price trend. Buying of lead and zinc has been light, with quotations unchanged.

Copper.—Favorable copper statistics for June, accompanied by a fairly satisfactory volume of buying, particularly for foreign shipment, have tended to strengthen the copper market. Sales were made during the week quite freely at 12.62½c. per lb., delivered, but late on Monday no more copper at this figure appeared to be available, and on Tuesday the market had undoubtedly strengthened to 12.75c., delivered. Sales for foreign account totaled several thousand tons a day, the price of the Copper Export Association continuing at 13c., delivered European ports. Germany, as usual, took the bulk of the metal sold abroad, but France and England also were substantial buyers. The June copper statistics revealed that output of primary copper by American mines was 69,539 tons, against a May output of 71,613 tons. Total production of primary copper in the first half amounted to 426,988 tons, compared with 433,198 tons in the first half of 1926. Total shipments of refined copper in the first six months amounted to 736,509 tons, of which 430,820 tons was for domestic use and 305,689 tons went abroad. Of the total exports of refined copper in June, Germany took 21,163 tons; its receipts in the six months also led those of all other countries, being 88,825 tons. The decline in the output

of copper in June is in line with the apparent tendency in the industry to restrict production in line with the volume of buying.

Tin.—Sales of tin were in fair volume during the week, totaling about 1700 tons from Wednesday, July 13, to today, July 19, but dealers were more active purchasers than consumers. Prices moved over a narrow range, reaching a low point of 63.75c. per lb. on last Wednesday and today and a high point of 64.50c. on Friday. Receipts from the Far East have been fairly large, totaling 3755 tons up to and including July 16, indicating that by the end of the month the figure will be fully 7000 tons, which will duplicate the June imports. The London market today was cabled as follows: Spot standard, £285 15s.; future standard, £279 12s. 6d.; spot Straits, £292 5s. The Singapore price was £288 5s.

Lead.—The market shows a slightly stiffening tendency, with quotations at 5.95c. to 5.97½c., St. Louis, with indications that the lower price is disappearing. Several fairly large orders have been entered at the higher figure, and some producers are unwilling to make sales at anything below 5.97½c. The New York market continues at 6.20c., which is the official quotation of the American Smelting & Refining Co. as announced on July 7.

Zinc.—The zinc market is steady, with a fair demand for prompt shipment. Prices continue on the basis of 6.17½c. per lb., St. Louis, and 6.52½c., New York, with some sellers asking 6.20c., St. Louis, and 6.55c., New York.

Antimony.—The market is dull, and there are offerings at 11.50c., duty paid, New York, for prompt delivery, with futures ruling a little higher.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	65.00c. to 66.00c.
Tin, bar	67.00c. to 68.00c.
Copper, Lake	13.50c.
Copper, electrolytic	13.25c.
Copper, casting	12.75c.
Zinc, slab	7.25c. to 8.25c.
Lead, American pig	7.25c. to 8.25c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	14.50c. to 15.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure) ..	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy ..	26.00c. to 27.00c.
Babbitt metal, commercial grade ..	30.00c. to 40.00c.
Solder, ½ and ¼	42.00c. to 43.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	69.50c.
Tin, bar	71.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc slab	7.25c.
Lead, American pig	7.25c.
Antimony, Asiatic	18.00c.
Lead, bar	8.75c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	25.50c.
Solder, ½ and ¼	39.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	17.50c. to 18.25c.
Copper, hot rolled	21.25c. to 22.25c.
Copper, cold rolled, 14 oz. and heavier, ..	23.50c. to 24.50c.
Seamless Tubes—	
Brass	22.37½c. to 23.37½c.
Copper	23.25c. to 24.25c.
Brazed Brass Tubes	25.50c. to 26.50c.
Brass Rods	15.25c. to 16.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9) casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Non-Ferrous Rolled Products

The mill price on copper wire advanced ¼c. to 14.75c. on July 18. Other quotations on bronze, brass and copper products are unchanged. Lead full sheets and zinc sheets are holding at the reductions of July 8 and May 25 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	17.50c.
Copper, hot rolled	21.25c.
Zinc	9.75c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	22.37½c.
Copper	23.25c.
Rods—	
High brass	15.25c.
Naval brass	18.00c.
Wire—	
Copper	14.75c.
High brass	18.00c.
Copper in Rolls	20.25c.
Brazed Brass Tubing	25.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets 0 to 10 gage, 3 to 30 in. wide	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	18.50c.
Copper, hot rolled	21.25c.
Copper, cold rolled, 14 oz. and heavier	23.50c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	23.87½c.
Copper	24.75c.
Brazed Brass Tubes	27.75c.
Brass Rods	15.25c.

Nickel.—The quotations for nickel remain unchanged at 35c. per lb. for ingot and 36c. per lb. for shot. Electrolytic nickel is quoted at 39c.

Aluminum.—The Aluminum Co. of America's published prices are 25c. to 26c. per lb., delivered, for ingots, 98 to 99 per cent. pure.

Non-Ferrous Metals at Chicago

JULY 19.—Sales, though in small lots, are more numerous and prices for non-ferrous metals at Chicago are stronger. An increase in demand for old metals is resulting in a stiffening of quotations.

Prices, per lb., in carload lots: Lake copper, 12.75c.; tin, 66c.; lead, 6.10c.; zinc, 6.30c.; in less-than-carload lots, antimony, 13.50c. On old metals we quote copper wire, crucible shapes and copper clips, 9.75c.; copper bottoms, 8.75c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

Order to Arbitrate Does Not Prejudice Tutein Contract

The contract of E. Arthur Tutein, Inc., Boston, with the Hudson Valley Coke & Products Corporation, Troy, N. Y., for the sale of pig iron and coke, which is now the subject of controversy following cancellation by the latter company, is in no way prejudiced by the order to arbitrate the dispute, according to a decision signed by Justice Alfred H. Townley of the New York Supreme Court. Justice Townley appended his signature to the order in the absence of Justice Phoenix Ingraham, who had acted in the case since its inception. The order, which is at once a permanent injunction protecting the rights of the parties to the case and a command to arbitrate, says, in part:

"Ordered, that the petitioner and respondent forthwith proceed to arbitrate their disputes under two certain contracts between the said parties dated July 22, 1924, and July 1, 1926, copies of which contracts are attached to the petitioner's moving papers and marked Exhibits 'A' and 'C,' and that said arbitration proceed forthwith before the arbitrators selected according to the provisions of the said contract. Nothing contained in this paragraph shall be construed as a determination as to the right of the arbitrators to pass upon whether or not the petitioner shall be continued as the sales agent of the respondent under said contract, as so supplemented."

The arbitrators, therefore, will decide whether the contract should be continued, and, if not, what damages, if any, are due to either side.

Employment Declines in Metal Trades

Employment in June in shops affiliated with the National Metal Trades Association, Chicago, totaled 568,455, as compared with 591,353 in May. This is the third consecutive monthly decline. In 1926 there was also a steady decline in employment from March until July, although the totals reported were larger than this year. The number employed in June, 1926, was 612,108, or 43,653 larger than the total for the same month this year. All sections of the country reported losses in employment in June, 1927, except Illinois, Iowa and Missouri, as represented by reports from Chicago, St. Louis, Peoria, Ill., Rock Island, Ill., Davenport, Iowa, and Moline, Ill. Employment in Detroit was reported as 189,398, as compared with 240,927 in June, 1926, a decline of 21 per cent.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.00c.	12.25c.
Copper, heavy and wire	10.75c.	11.75c.
Copper, light and bottoms	9.25c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.00c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.50c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.25c.
Zinc	4.00c.	4.25c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

REINFORCING STEEL

Awards of More Than 6000 Tons—3300 Tons Involved in Work Pending

A sewage plant at Stickney, Ill., requiring 2000 tons, is the only large award in the 6000 tons of bars reported let during the last week. New projects include 1150 tons for an automobile service building in New York and 1000 tons for a theater at Louisville, Ky. Awards follow:

WHITE PLAINS, N. Y., 100 tons, Carpenter Storage Warehouse, to Kalman Steel Co.
NEW YORK, 455 tons, building for F. H. Bennett Biscuit Co., 436 East Tenth Street, to Concrete Steel Co.
NEW YORK, 200 tons, building for Consolidated Laundries Corporation, to Truscon Steel Co.
BROOKLYN, 100 tons, building for Keystone Varnish Co., 71 Otsego Street, to Kalman Steel Co.
LONG ISLAND CITY, N. Y., 250 tons, foundations for Bloomingdale Warehouse, to Jones & Laughlin Steel Corporation.
FREEPORT, N. Y., 800 tons, Conduit Boulevard, from Johnson, Drake & Piper, general contractors, to Concrete Steel Co.
JAMESTOWN, N. Y., 100 tons, Grandin mill and elevator, to a Buffalo maker.
BUFFALO, 125 tons, sewage disposal plant, village of Cheektowaga, to a Buffalo maker.
PHILADELPHIA, 200 tons, building for U. G. I. Contracting Co. at Sixth and Duncannon Streets, to McClintic-Marshall Co.
STICKNEY, ILL., 2000 tons, sewage treating plant, to American System of reinforcing.
CHICAGO, 150 tons, of rail and billet bars, apartment building, to Olney J. Dean & Co.
CHICAGO, 130 tons, rail and billet bars, Dunning Hospital, to Olney J. Dean & Co.
OAK PARK, ILL., 150 tons, apartment building, to Olney J. Dean & Co.
JOLIET, ILL., 200 tons, furniture factory at State prison, to Olney J. Dean & Co.
SEATTLE, WASH., 700 tons, apartment building, to an unnamed company.
OAKLAND, CAL., 100 tons, hotel, Jackson near Seventeenth Street, to Frederick Steel Co., Alameda, Cal.
LOS ANGELES, 260 tons, garage, Eighth and Normandie Avenues, to an unnamed local jobber.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 200 tons, hospital unit, Massachusetts General Hospital.
NEW YORK, 1150 tons, Cadillac service building, Columbus Avenue and Sixty-second Street, Turner Construction Co., general contractor.
RICHMOND HILL, N. Y., 100 tons, Richmond Hill High School.
FAR ROCKAWAY, N. Y., 270 tons, boardwalk; general contract not let.
STATE OF NEW JERSEY, 1000 tons; O'Neill Co., Philadelphia, low bidder on 825 tons, and Edward Ellis, Camden, N. J., low bidder on 175 tons.
CHICAGO, 100 tons, building for Murphy Ward Dairy Co.
DOWNERS GROVE, ILL., 100 tons, high school; Royer, Danley & Smith, architects.
LOUISVILLE, KY., 1000 tons, Loew's theater.
SAN FRANCISCO, 200 tons, Fox theater; bids Aug. 20.

FABRICATED STRUCTURAL STEEL

New Projects Will Take 44,600 Tons—Awards Total 40,500 Tons

Structural steel awards during the last week amounted to more than 40,500 tons, of which 8000 tons was for an hotel addition in Pittsburgh and 6500 tons for a bank building in Brooklyn. New projects under negotiation, totaling 44,600 tons, include 6000 tons for a bank building in New York, 4000 tons for a bridge across the Ohio River at Cincinnati and 3500 tons for an hotel in Los Angeles. Awards follows:

HANOVER, N. H., 170 tons, scientific building, Dartmouth College, to New England Structural Co.
PROVIDENCE, R. I., 197 tons, dormitory, House of Good Shepherd, to Levering & Garrigues Co.
NEW YORK, 1700 tons, telephone building, East Fifty-sixth Street, to Hay Foundry & Iron Works.
NEW YORK, 775 tons in the following awards as reported to the Structural Steel Board of Trade, Inc.: Addition to Fifth Avenue Bank at Fifth Avenue and Forty-fourth Street, and Seamen's Church institutional building at Coenties Slip and Front Street, to Post & McCord; substation for New York Edison Co. at 256 West 124th Street, to Hedden Iron Construction Co.; Evergreen Telephone Building, Ridgewood, N. Y., to Eidlitz & Ross.
NEW YORK, 340 tons, rectory, University and Burnside Avenues, to Kues Brothers.
NEW YORK, 330 tons, sales room, 149 East Fifty-ninth Street, to Easton Structural Steel Co.
NEW YORK, 275 tons, Lincoln School building for Columbia University, to Harris Structural Steel Co.
NEW YORK, 100 tons, storage station, Ireland Mill Road, Queens, to National Bridge Works.
RICHMOND HILL, L. I., 2300 tons, high school building, to an unnamed fabricator.
BROOKLYN, 6500 tons, Williamsburg Savings Bank, to George A. Just Co.
TRENTON, N. J., 500 tons, theater and business building, to Newton-Bugbee Co., Trenton.
BALTIMORE & OHIO RAILROAD, 350 tons, bridges, to American Bridge Co.
CONOWINGO, MD., 400 tons, substation for Conowingo dam, to Blaw-Knox Co.
ELIZABETH, N. J., 500 tons, office building, to Harris Structural Steel Co.
ELIZABETH, 300 tons, office building, to McClintic-Marshall Co.
PENNSYLVANIA RAILROAD, 275 tons, bridges; 150 tons to McClintic-Marshall Co. and 125 tons to Bethlehem Steel Co.
PEBKSKILL, N. Y., 1500 tons, Park Hill Viaduct, to Phoenix Bridge Co.
CLEVELAND, 200 tons, Sheets Elevator Co. warehouse, to Forest City Structural Steel Co.
FINDLAY, OHIO, 125 tons, Hancock Brick & Tile Co., factory, to Bellefontaine Bridge Co.
STERLINGTON, LA., 600 tons, power house for Louisiana Power Co., to Ingalls Iron Works, Birmingham.
PITTSBURGH, 8000 tons, addition to William Penn Hotel, to American Bridge Co.
CALUMET, MICH., 450 tons, storage building for a copper company, to American Bridge Co.
CHICAGO, 2000 tons, Milliners' Building, to American Bridge Co.
WINONA, MINN., 200 tons, gymnasium, to American Bridge Co.
LAUREL, MINN., 400 tons, highway bridge, to American Bridge Co.
ABERDEEN, S. D., 400 tons, hotel, to St. Paul Foundry Co.
ST. LOUIS, 400 tons, insurance building, to Atlas Iron Works, local.
EAST MOLINE, ILL., 1800 tons, warehouse for International Harvester Co., to Worden-Allen Co.
CAMERON, WIS., 250 tons, dairy plant, to Worden-Allen Co.
MILWAUKEE, 225 tons, new House of Good Shepherd group, to Worden-Allen Co.
OSHKOSH, WIS., 200 tons, new machine shop for Universal Motor Co., to Worden-Allen Co.
LEES FERRY, ARIZ., 1000 tons, bridge, to Kansas City Structural Steel Co.
DENVER, 4000 tons, Mountain State Telephone Building, to Midwest Steel & Iron Co., previously reported to American Bridge Co.
ALHAMBRA, CAL., 100 tons, factory building for Reliance Mfg. Co., to Union Iron Works of Los Angeles.
SAN PEDRO, CAL., 625 tons, City Hall building, to Union Iron Works of Los Angeles.
FRESNO, CAL., 145 tons, Cory Theater, to Mortenson Construction Co., San Francisco.
LOS ANGELES, 350 tons, Church of the Blessed Sacrament, to Llewellyn Iron Works, Los Angeles.
SAN FRANCISCO, 100 tons, St. Joseph's Chapel, wing to St. Joseph's Hospital, to Dyer Brothers, San Francisco.

SAN FRANCISCO, 150 tons, plates for Standard Oil Co. of California, to an unnamed Eastern mill.
SAN FRANCISCO, 900 tons, plates for Southern Pacific Co., to an unnamed Eastern producer.
SAN FRANCISCO, 340 tons, Children's Hospital, to Judson Mfg. Co., San Francisco.
SAN FRANCISCO, 150 tons, factory building for the Pacific Can Co., to Central Iron Works, San Francisco.
OAKLAND, CAL., 370 tons, pier at foot of Grove Street, for Oakland Harbor Commission, to California Steel Co., San Francisco.
OAKLAND, 150 tons, fabricated pipe line for the East Bay Water Co., to the Montague Pipe & Steel Co., San Francisco.
VANCOUVER, WASH., 150 tons, addition to Deaf and Dumb Institute, to Lidgerwood Pacific Co.
TACOMA, WASH., 250 tons, addition to Smelter, to Star Iron & Steel Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

THOMASTON, ME., 175 tons, cement plant.
BOSTON, 1200 tons, hospital unit, Massachusetts General Hospital.
BOSTON, 750 tons, Newton Hospital addition.
PROVIDENCE, R. I., 1200 tons, theater and stores.
BRIDGEPORT, CONN., 1300 tons, First National Bank Building; previously reported as 1000 tons.
NEW YORK, 6000 tons, Bank of New York & Trust Co., Wall and William Streets.
NEW YORK, 800 tons, apartment building, 451 East Fifty-seventh Street.
NEW YORK, 400 tons, laundry building, Presbyterian Hospital, Broadway and 168th Street.
LONG ISLAND CITY, N. Y., 700 tons, building for Borden's Farm Products Co., Inc., Steinway Avenue.
BROOKLYN, 500 tons, building for Mergenthaler Linotype Co.
PHILADELPHIA, 6000 tons, Broad Street subway, previously reported; bids opened July 19; Hyman & Goodman, New York, low bidders on general contract.
PHILADELPHIA, 450 tons, laboratory building for University of Pennsylvania.
CHESAPEAKE & OHIO RAILWAY, 4000 tons, approaches to Ohio River Bridge; bids to be taken July 25.
PHILO, OHIO, Ohio Power Co., power plant, 2500 tons.
WILMINGTON, DEL., 200 tons, Physicians' and Surgeons' Building.
ALLENTOWN, PA., 550 tons, highway bridge.
LEHIGH VALLEY RAILROAD, 200 tons, bridges.
SYRACUSE, N. Y., 700 tons, Memorial Hospital.
UTICA, N. Y., 800 tons, theater.
MADISON, WIS., 100 tons, garage.
CHICAGO, 2300 tons, office building.
CHICAGO, 1800 tons, building for Nash Sales Co.
CHICAGO, 700 tons, building for Johns-Manville, Inc.
SOUTH CHICAGO, 3000 tons, open-hearth building for Wisconsin Steel Co.
MILWAUKEE, 500 tons, viaduct for a utility company.
GARY, IND., 600 tons, municipal building.
ST. LOUIS-SAN FRANCISCO RAILWAY, 650 tons, bridge.
KANSAS CITY, MO., 650 tons, viaduct for Kansas City Public Service Co.
LOS ANGELES, 2000 tons, Ford Motor plant; bids being taken.
LOS ANGELES, 1400 tons, plant for the Goodrich Rubber Co.
LOS ANGELES, 600 tons, Emanuel Presbyterian Church.
LOS ANGELES, 3500 tons, addition to Biltmore Hotel.
SAN FRANCISCO, 800 tons, Y. M. C. A. building; bids to be called soon.
SAN FRANCISCO, 300 tons, Seventh Street viaduct for Southern Pacific Co.
OAKLAND, CAL., 1000 tons, wharf sheds.
EUGENE, ORE., 250 tons, telephone building.
SEATTLE, WASH., 2000 tons, auditorium.

RAILROAD EQUIPMENT

The Louisville, Henderson & St. Louis Railway Co. is in the market for a locomotive.

The Universal Portland Cement Co. will buy a switching locomotive.

The Ross Power Equipment Co., Merchants Bank Building, Indianapolis, is in the market for a number of 50-ton hopper cars, standard gage.

The Chicago, Rock Island & Pacific has ordered 100 steel gondola car bodies from the American Car & Foundry Co. The Chicago & North Western has bought 50 steel underframes for caboose cars from the Bettendorf Co.

The Erie has ordered 25 baggage-express cars from the Standard Steel Car Co.

The Wichita Falls & Southern ordered 50 box cars from the American Car & Foundry Co.

PERSONAL

WALTER C. CARROLL, for the past six years vice-president of the Inland Steel Co., Chicago, will resign, effective Aug. 1, to become president of the National Association of Sheet and Tin Plate Manufacturers, with headquarters at Pittsburgh.



WALTER C. CARROLL

He entered the steel business in the mills of the American Sheet Steel Co. in 1902, and was appointed district sales manager for that company at Detroit in the following year. When the American Sheet Steel Co. consolidated with the American Sheet & Tin Plate Co. in 1904, Mr. Carroll was transferred to the Pacific Coast sales office. In 1906 he was moved to the St. Louis sales office, and in 1908 he was made assistant general manager of sales for the Sheet & Tin Plate company, with headquarters at Pittsburgh. In 1921 he went to Chicago as vice-president of the Inland company.

James H. Kinney, whose appointment as general manager of the Cyclone Fence Co., Waukegan, Ill., was mentioned in THE IRON AGE last week, went to work as foreman in the mill of the Cyclone Woven Wire Fence Co., Cleveland, in 1910. When the company was purchased by the Cyclone Fence Co. in 1916 he was transferred to the sales department as manager of the Cleveland factory and sales district. He went to Waukegan as general sales manager in 1924. H. G. Chapman, who succeeds Mr. Kinney as general sales manager, came to the company in 1919 as Eastern district sales manager and was appointed assistant general manager of sales in January, 1926.

Major Victor E. Edwards, vice-president and consulting engineer Morgan Construction Co., Worcester, Mass., had the degree of Doctor of Engineering conferred upon him at the graduation exercises of the Worcester Polytechnic Institute, Worcester, Mass., on June 20.

K. H. Klugewitz, export sales manager of North and South America for Ferrostahl G.m.b.h., export house of Gutehoffnungshütte, Oberhausen, Germany, arrived in New York on the Leviathan, July 18. Prior to his present connection, he was export sales manager for the Thyssen interests in Germany for about 15 years and was at one time associated with E. D. Giberson & Co., 40 Rector Street, New York, the present agents of Ferrostahl G.m.b.h.

John C. Ruf, since last October president of the Johnson Belting Co., 423 East Fifty-sixth Street, New York, has resigned. He was associated for a number of years with I. B. Williams & Sons, Dover N. H., and has spent the greater part of his life in the mill supply business. He was twice president of the American Supply and Machinery Manufacturers' Association. Mr. Ruf will spend the remainder of the summer at Spring Lake, N. J.

W. W. Wixson, for several years associated with the Bonney Forge & Tool Works, Allentown, Pa., has been appointed district sales manager of the Central district.

Charles R. Trimmer, district representative in the Michigan territory for the Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, has been appointed

vice-president in charge of sales with headquarters at the company's Chicago plant.

M. J. Harkless, previously an engineer in the railroad and marine supply department of the Buda Co., Harvey, Ill., has been made sales engineer in the contractor's department of the Independent Pneumatic Tool Co., Chicago.

Julius S. Holl, advertising manager Link-Belt Co., Chicago, sailed for Europe on July 16, where he will remain for a month.

Reno V. Jones has been placed in charge of the sales office recently opened in the Lincoln Alliance Bank Building, Rochester, N. Y., by the Trumbull Steel Co., Warren, Ohio. He has been associated with the Trumbull company for four years.

O. H. Davison, formerly sales representative of the Blair Engineering Co., New York, in Pittsburgh and other parts of the country, has joined the United States Refractories Co., Mt. Union, Pa., as special representative. He has devoted many years to open-hearth furnace design and construction and in his new connection will center his efforts on open-hearth refractories. Vance M. Norton, who has been Pittsburgh district sales manager, has been appointed district representative of the Refractories company, with headquarters in Cleveland, and will cover the Buffalo, Erie, Cleveland, Toledo and Detroit districts.

F. M. Davis, president Davis & Thompson Co., Milwaukee, manufacturer of milling machines, is in Europe on a business and pleasure trip.

James W. Bancker, since 1923 comptroller of manufacture and president of the Manufacturers' Junction Railway Co. for the Western Electric Co., has been elected a director and vice-president in charge of purchasing and traffic for the company, succeeding the late Jay V. Odell. Mr. Bancker went to work for the company 35 years ago as an office boy and during the intervening years has held many positions, principally in the manufacturing department. In 1909 he was made superintendent of the New York shop and from 1911 until 1923 he was assistant works manager and superintendent of the cable rubber and insulating shop at the Hawthorne works, Chicago.

L. H. DeWyk, manager of the Miner & Peck Mfg. Co. and the Loy & Nawrath divisions of the Birmingham Iron Foundry, Derby, Conn., sailed for Europe on July 16 and will visit Holland, Germany, Belgium, France and Great Britain.

J. J. Swenson has been named general sales manager of the American Cast Iron Pipe Co., Birmingham, succeeding Paul Ivy. Mr. Swenson comes from Los Angeles, where he was in charge of the company's Pacific Coast sales office.

P. H. Sackett, district manager in Minnesota for the Harnischfeger Corporation, Milwaukee, has been placed in charge of the company's new branch office which has been opened at 330 Gateway Bank Building, Minneapolis. J. C. Yetter will assist in covering the territory in the capacity of sales engineer.

Albert R. King has been made assistant manager of the New York branch of the Crucible Steel Co. of America, located at Clark and Dominick Streets. He was associated for a number of years with Manning, Maxwell & Moore, Inc., New York. W. P. Knecht has been made supervisor of an associate sales office which the New York branch of the Crucible company has opened recently at Harrison, N. J.

William S. Kriebel, Jr., has been added to the sales organization at Philadelphia of the Bridgeport Brass Co., Bridgeport, Conn. He was for several years identified with the sales office of the Ansonia branch of the American Brass Co., but more recently has been vice-president and sales manager of an automobile accessory jobbing business at Philadelphia.

Conference on Human Relations in Industry

The tenth annual conference on human relations in industry, under the auspices of the Industrial Department of the Young Men's Christian Association, will be held at Silver Bay on Lake George, Sept. 1-4, inclusive. Among those announced to deliver addresses or enter into the discussions are the following:

Arthur H. Young, Industrial Relations Counselors, Inc., New York; C. S. Ching, supervisor, industrial relations, United States Rubber Co.; George B. Cutten, president, Colgate University; John H. Frye, American Telephone & Telegraph Co.; Robert T. Kent, general manager, Bridgeport Brass Co.; J. M. Larkin, assistant to president, Bethlehem Steel Co.; J. B. Parrish, assistant vice-president, Chesapeake & Ohio Railway Co.; W. H. Winans, head of industrial relations department, Union Carbide Co.; Haley Fiske, president, Metropolitan Life Insurance Co.; Prof. Elton Mayo, Harvard University; Dr. James A. Britton, chief medical examiner, International Harvester Co.; Dr. Peter A. Speek, head of the Slavic division, Library of Congress; Arthur T. Morey, general manager, Commonwealth Steel Co.

Fred H. Rindge, Jr., 347 Madison Avenue, New York, is executive secretary in charge of arrangements.

Denies Merger With Other Radiator Companies

C. F. Bennett, secretary of the Pierce, Butler & Pierce Mfg. Corporation, New York, has made the following statement regarding the position of that company with respect to a merger of several radiator manufacturers: "This corporation has made no agreement for merger with any other company or companies and has under consideration no change whatever in its present policy." Other companies which have been mentioned in connection with the merger are the Gurney Heater Mfg. Co., Boston; the National Radiator Co., Johnstown, Pa.; the Union Radiator Co., Johnstown, Pa.; the Utica Heater Co., Utica, N. Y.; the Niagara Radiator & Boiler Co., North Tonawanda, N. Y., and the Continental Heater Corporation, Dunkirk, N. Y.

Meetings of Steel Building Interests

The fifth annual convention of the American Institute of Steel Construction, Inc., will be held Oct. 25 to 29, at Pinehurst, N. C. Charles F. Abbott, 285 Madison Avenue, New York, is executive director.

The National Association of Ornamental Iron and Bronze Manufacturers will hold its twentieth annual convention Sept. 20 to 22 at West Baden, Ind. Standardization and individuality in the industry will form an important part of the program, and steps will be taken toward establishing a closer cooperation between architects and contractors by a more general use of a standard classification list of materials, recently adopted by the association and by the American Institute of Steel Construction. A. L. Graham, 195 Platt Street, Rochester, N. Y., is secretary of the association.

The Batcheller Saw & Tool Corporation, Port Jervis, N. Y., has been organized by Walter R. Batcheller, to manufacture hand saws. Purchase is announced of the plant of the Jennings & Griffin Saw Mfg. Co. in Port Jervis, which will be the headquarters of the company. For 12 years prior to the World War Mr. Batcheller was associated with the Simmons Hardware Co., St. Louis. During the war he was a major in the engineers, in charge of purchasing hardware and machinists' tools. He later went with the Ohlen & Bishop Co., Columbus, Ohio, manufacturer of saws, in the capacity of vice-president and general manager. In August, 1923, Mr. Batcheller associated himself with Clemson Bros., Inc., Middletown, N. Y., as vice-president, resigning from this connection on May 1 last.

Growth of Group Industrial Life Insurance

Industrial group life insurance has developed from a beginning 15 years ago to a present protection on the lives of 4,700,000 employees, according to figures of the National Industrial Conference Board. The protection involved aggregates \$5,500,000,000. The increase in coverage during the past two years alone has aggregated more than 1,500,000 persons.

Investigations which led up to the adoption of this modern protective method showed that more than 40 per cent of all wage earners were carrying no insurance whatsoever. Most of those who were insured had policies of less than \$500. Many employees, either because of occupational hazard or advanced age, were unable to procure insurance, or had to pay prohibitive rates for what they could get.

As an indication of what this business has meant to the insurance companies, it may be stated that the premium cost is running between \$55,000,000 and \$65,000,000 a year. The larger portion of this is paid by employers. Present trend, however, is toward the contributory plan, under which employees pay part of the cost.

Research in Oil Burning

Fundamental study of the general process of combustion in an oil flame is to be studied at Johns Hopkins University, Baltimore, this summer, by Theodor Theodorsen of the faculty of that institution. The investigation will cover air-fuel ratio, shape and size of combustion chamber, possible draft variations, and methods of mixing fuel in domestic oil burners. Relative heat efficiencies under varying conditions will be studied, while losses due to incomplete combustion will be carefully analyzed.

Obituary

FREDERICK J. KINGSBURY, JR., chairman Bridgeport Brass Co., Bridgeport, Conn., died at his home in New Haven on July 11, aged 64 years. He was born at Waterbury, Conn., and attended the St. Paul's School, Concord, N. H., and the Massachusetts Institute of Technology, Cambridge, Mass., graduating from the latter institution in 1885. He began his business career with the Scovill Mfg. Co., Waterbury, serving in both the mills and office. In 1889 he became secretary of the Aluminum, Brass & Bronze Co., Bridgeport, now the Housatonic Avenue branch of the Bridgeport Brass Co. He was made secretary and a director of the latter company in 1895, and before becoming chairman of the board in September, 1921, he was successively treasurer, general manager and president. Mr. Kingsbury was a director of the American Tube & Stamping Co., Bridgeport, and of the Scoville Mfg. Co., Waterbury.

JESSE L. POTTER, treasurer Fuller-Warren Co., Milwaukee, manufacturer of stoves and ranges, died July 14 after an illness of seven months. He was 67 years of age and a native of New York State. After several years' connection with the Peninsula Stove Co., Mr. Potter assisted in the organization of the Fuller-Warren Co. at Milwaukee in 1892, becoming treasurer, and holding that office continuously for 35 years.

JAMES F. LANNIGAN, president Davis Foundry Co., and until recently president Lawrence Machine & Pump Co., Lawrence, Mass., died in that city on July 14. He was born in Kilkenny, Ireland, in 1843, and came to this country early in life. He was connected with the foundry industry for more than 46 years. The machine and pump business recently was sold to the John W. Bolton & Sons Co.

ARTHUR V. HANNIFIN, treasurer Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, manufacturer of air operated chucks and adjustable boring bars, died on July 4.

Expanding Sales Abroad of American Industrial Machinery

WASHINGTON, July 19.—Pointing out the growth of export trade in American industrial machinery, the Department of Commerce has issued a statement showing that it expanded from about \$50,000,000 in 1910 to \$156,000,000 in 1926. Latin American countries have for several years absorbed about one-third of these exports, Europe about one-fourth, Canada and Newfoundland about one-fifth and the countries of Asia about one-eighth.

In spite of money depreciation and lower costs of production abroad, American machinery exports are making substantial gains. There were shipments of more than \$38,000,000 to European countries in 1926. For the past two years the United Kingdom has absorbed more than \$18,000,000 annually in American machinery. Germany has taken more than \$3,000,000 worth of machinery for each of the two years; France, nearly \$5,000,000 annually; Belgium and Spain about \$1,000,000 and Italy about \$2,000,000.

Canada, as usual, was our best customer. Mexico, most important of the Latin-American group, was in the \$10,000,000 class. Cuba may approximate this level if conditions improve.

World Shipbuilding Shows Increase

With nearly three hundred thousand gross tons more of merchant vessels under construction throughout the world now than at the end of March, and with over 900,000 tons more than at the beginning of this year, a return to the pre-war volume of production may be under way, says a statement just issued by Lloyd's Register of Shipping, based on returns from all maritime countries for the quarter ended June 30 last. The United States and France are the only countries showing a decline since March.

The rapid rise toward the close of the war, and for several years thereafter, was followed by a severe decline in output, which continued almost without a break until September of last year, when the returns showed only 1,850,000 gross tons building. From that point there has been a gradual gain, until at the end of this June the returns showed a total only about 320,000 tons less than the June, 1914, figures, and one of almost 500,000 gross tons more than were building at the end of September, 1923. The present total is 2,840,000 gross tons.

Decline in River Movement of Steel in Pittsburgh District

June commerce on the Allegheny, Monongahela and Ohio rivers within the district of the United States Engineers' Pittsburgh office, covering much of the navigable portion of the Allegheny and Monongahela rivers and the Ohio River as far as Wellsburg, W. Va., aggregated 2,929,511 net tons and was the largest total, except for March, this year. There was a decrease of approximately 16,000 tons as compared with May, in the shipments of iron and steel products. This loss probably was due largely to a sharp curtailment of pipe shipments to Southern warehouses, as that product has not been so much in demand for oil well drilling this year as last, owing to the overproduction of oil and the decrease in drilling due to the resultant decline in oil prices. For the six months ended June 30 Pittsburgh district river commerce amounted to 17,264,522 net tons, of which almost 74 per cent was coal. Iron and steel shipments for the period amounted to 432,511 net tons, or slightly more than 2½ per cent of the total.

Detailed figures in net tons follow:

	June	May	April	Six Months' Total
Coal	1,836,477	1,791,464	1,856,071	13,070,067
Coke	190,752	180,423	113,867	731,307
Gravel	352,514	294,783	311,263	1,339,862
Packet cargo	4,494	5,193	4,640	25,371
Sand	435,334	309,099	348,697	1,498,236
Iron and steel	76,639	92,384	84,711	432,511
Unclassified	33,301	25,249	38,797	167,168
Totals	2,929,511	2,698,595	2,758,046	17,264,522

Employment Maintained in Ohio Foundries and Machine Shops

June reports from 64 Ohio foundries and machine shops show practically no change in the employment situation as compared with May, but the number of wage earners averaged 4 per cent more than in June, 1926, according to the Bureau of Business Research of Ohio State University in its monthly bulletin. The index figure for last month stood at 95, an average month in 1923 being taken as 100. In Ohio steel works and rolling mills there was a slight downturn in employment amounting to 3.2 per cent, but the June index still is 2 per cent above that for the same month last year. The fact is pointed out that fluctuations in employment in steel works and rolling mills have been confined to a relatively narrow range since last December. A survey of the number of wage earners in Ohio blast furnaces in June revealed a small increase over May, but a decline of 13.4 per cent from June, 1926.

Immigration in May Provided 25,671 Increase in American Population

WASHINGTON, July 16.—Of the 52,718 aliens admitted to the United States in May, 31,819 were immigrants or newcomers for permanent residence. Of the 23,126 departures, 16,978 had been in the United States on a visit, or intend to return after a short stay abroad. Mexico and Canada were the principal sources of immigration in May, according to the Bureau of Immigration, 6856 immigrant aliens coming from the former and 5259 from the latter country. Germany with 4934 sent the largest number of immigrants coming from Europe in May, while 3534 came from the Irish Free State, 2659 from Great Britain and 2507 from Italy.

Iron and steel workers admitted in May totaled 264, while for the 11-month period ended May 31 the number was 2271. Departures for the respective periods were 22 and 170. Machinists entering the United States in May were 208 while for the 11-month period the number was 1984. Departures for the respective periods were 44 and 443.

More Track Work Shipped in Second Quarter

Shipments of trackwork for tee-rail track of 60 lb. and heavier are reported by the American Iron and Steel Institute at 42,168 net tons for the second quarter of the year. This is the highest quarter's shipment since a year ago, when the total was 49,143 tons. It compares with 40,128 tons in the first quarter of this year. The figures include switches, switch stands, frogs, crossings, guard rails and appurtenances, of both carbon and manganese steel.

Shipments during the three month of the quarter were 14,891 tons in April, 14,465 tons in May and 12,812 tons in June. Except for the March shipments of 16,778 tons, those of April were the largest since June of last year. For the first half year the 82,296 tons shipped compared with 100,304 tons a year ago.

Increase in Mechanical Stokers

More mechanical stokers were sold in June than in any month since June, 1926, according to figures of the Department of Commerce. Eleven establishments reported 153 stokers in June, aggregating 54,804 hp. This compares with 97 units in May, of 43,601 hp., and with 175 in June last year, of 68,408 hp.

Production of electric power by public utility plants in the United States in 1926 is given by the Geological Survey at 73,791,064,000 kw. hr. Of this amount, 35.5 per cent was generated by water-power and the remainder by fuels. The total under each heading is a large increase over the previous maximum, which was that of the previous year. The gain in water-power was 17.1 per cent, and in fuel power, 9.4 per cent.

Machinery Markets and News of the Works

CURRENT DEMAND SMALL

Railroads and Automobile Builders Inactive at Present

**Weirton Steel Co. Buys 14 Tools and Bartlett
Hayward Co. Closes \$50,000 List for Brooklyn**

BUSINESS in machine tools continues limited to small purchases by industrial users, the railroads providing almost no activity at present. July business is expected to show a decrease as compared with June, although there have been a few desirable lists closed.

Purchases by the Bartlett Hayward Co. for a machine shop in Brooklyn, N. Y., total upward of \$50,000 and in the Pittsburgh district a list of about 14 tools closed by the Weirton Steel Co., are leading developments.

Current activity of automobile manufacturers and

railroads is negligible, but there is apparently some prospect of early resumption of purchasing by the latter. Two Northwestern railroads are expected to issue lists within the next month. The Santa Fe has practically closed on its inquiry and may purchase additional tools.

In addition to such expected railroad purchasing, dealers in the Pittsburgh district report a few pending lists of fair size and some future business is seen in the new plant of the General Motors Truck Corporation at Pontiac, Mich., and the recent destruction by fire of a pattern shop of the American Sheet & Tin Plate Co., which has brought that company into the market for a few wood-working tools.

Total sales this year are reported by some districts as comparable to or slightly in excess of the same period of last year, but in most cases metal working plants are operating on reduced schedules and recent bidding for business is particularly keen.

New York

NEW YORK, July 19.

THE Bartlett Hayward Co., Baltimore, has placed orders, probably totaling upward of \$50,000, for a machine shop for the Brooklyn Union Gas Co. The business was divided, some of it going to a dealer in Baltimore and the remainder was split up among New York sales agencies. Otherwise machine tool business has been of extremely light proportions. Some sellers report, however, that inquiries are more numerous than two or three weeks ago. Among the week's sales were the following: A gear-driven profiling machine to a New York printing press manufacturer; a 16 x 60-in. lathe to a Chicago engineering company; a 1 x 18-in. automatic lathe to a Massachusetts manufacturer of small tools; a 16-in. vertical shaper to an electrical manufacturer in Chicago, and a 4-spindle drum-type milling machine to a Detroit motor car manufacturer.

The Kings County Refrigerating Co., 24-48 Hall Street, Brooklyn, has plans under way for a new four-story cold storage and refrigerating plant, to cost approximately \$50,000 with equipment. J. G. Glover, 2772 Ocean Avenue, is architect.

The Board of Water Supply, Municipal Building, New York, is asking bids until July 26 for machine tools and other equipment for the Schoharie reservoir and Shandaken tunnel.

Moore & Landsiedel, Third Avenue and 148th Street, New York, architects, have completed plans for a five-story automobile service, repair and garage building at 1095-1117 Washington Avenue, Brooklyn, to cost upward of \$500,000 with equipment.

Bids will be received by the Superintendent of Light-houses, Staten Island, N. Y., until July 25 for cast steel stud link ship mooring chain, totaling about 321,000 lb.; cast steel shackles and swivels for ship mooring chain, aggregating 16,000 lb.; wrought iron mooring chain for ships and buoys, totaling 599,370 lb.; wrought iron shackles and swivels for ship and buoy mooring chain, totaling 6772 lb.; for 7700 wrought steel buoy shackles, totaling 180,500 lb.; five cast steel mushroom anchors, two sizes, approximately 29,000 lb.; and six cast iron mushroom anchors, three sizes, totaling 33,600 lb., proposal 24578; until July 28, for 135 acetylene cylinders, each with capacity of 1060 cu. ft., proposal 24663.

The Eiseman Magneto Corporation, 32 Thirty-third Street, Brooklyn, manufacturer of magnetos and kindred products, has leased a building at Second Avenue and Thirty-third Street, for expansion in its repair and service department.

The Bellanca Aircraft Corporation of America, Inc., care of Andrew Bellanca, 165 Broadway, New York, lately organized with a capital of \$1,000,000, will establish its main plant at the former shipyard of the Downey Shipbuilding Corporation, Arlington, Staten Island, which has been leased with option to purchase. The tract comprises 173 acres with large water frontage. Present structures will be remodeled and machinery installed at once. The works will be given over to the production of single-motor and tri-motor monoplanes, seaplanes, flying boats and other aircraft. Giuseppe M. Bellanca is head.

Frank S. Parker, 280 Madison Avenue, New York, architect, has filed plans for a six-story automobile service, repair and garage building, 100 x 200 ft., at 211-25 West Sixty-first Street, to cost approximately \$300,000 with equipment.

The Manhattan Electrical Supply Co., 17 Park Place, New York, with factory on Morris Street, Jersey City, N. J., has concluded negotiations for the purchase of the plant and business of the Troy Laundry Machinery Co., East Moline, Ill., for \$5,000,000, and will operate as a subsidiary. It is understood that the present plant will be continued and expansion in production arranged.

The Quartermaster, United States Army, will offer at public auction on Aug. 9 the air reserve depot at Borden, Review and Bradley Avenues, Fox and Gilbert Streets, Long Island City, consisting of a group of two and six-story buildings, with traveling cranes, power house, garage, forge and blacksmith shop, and other structures.

Fire, July 9, destroyed a portion of the plant of L. Koss, manufacturer of commercial automobile bodies, occupying leased quarters at 369 Cherry Street, New York.

The Public Service Electric & Gas Co., Public Service Terminal, Newark, is said to have concluded arrangements for the purchase of a tract of 100 acres at Roseland, N. J., as a site for a proposed power plant. The company is acquiring property in West Orange, N. J., vicinity of Pleasant Valley Way, for a high tension transmission line.

William Neumann, 40 Journal Square, Jersey City, N. J., architect, has asked bids on a general contract for a two-story automobile service, repair and garage building to cost about \$100,000 with equipment.

The Essex County Board of Vocational Education, 969 Broad Street, Newark, has plans under way for a proposed boys' vocational school at Bloomfield, N. J., to cost

in excess of \$200,000 with equipment. Guilbert & Betelle, 24 Branford Place, Newark, are architects.

The Breen Iron Works, 276 Badger Avenue, Newark, has completed plans for a new one-story plant, 60 x 200 ft., at Hillside, N. J., to cost about \$40,000 with equipment.

The Board of Education, Ridgewood, N. J., is considering the installation of manual training equipment in a new junior and grade high school to cost \$450,000, to replace a structure recently destroyed by fire. Fanning & Shaw, 49 Ward Street, Paterson, N. J., are architects.

The Crane Co., 836 South Michigan Avenue, Chicago, and South and Mulberry Streets, Newark, has purchased property at 428-30 Mulberry Street, for a new factory branch to cost upward of \$50,000.

The Asphalt Tile Co., 250 Park Avenue, New York, roofing products, copper shingles, etc., has leased the building at 41-43 Frelinghuysen Avenue, Newark, for a new plant.

The Oxweld Acetylene Co., 630 Frelinghuysen Avenue, Newark, manufacturer of acetylene welding equipment, has superstructure in progress for a three-story addition, 70 x 100 ft., to cost more than \$100,000 with equipment. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are architects and engineers.

The Board of Education, Keyport, N. J., is said to be planning the installation of manual training equipment in a proposed two-story and basement high school to cost upward of \$175,000, for which plans have been drawn by John N. Pierson & Son, 198 Jefferson Street, Perth Amboy, N. J., architects.

The Gem of America Motor Car Corporation, 152 West Forty-second Street, New York, the organization of which was announced in THE IRON AGE of June 2, will manufacture automobiles by contract, the main feature being the company's own type of transmission. The plant is located at Riverside, N. J.

Zidac Products, Inc., 122 Union Avenue, Hempstead, N. Y., has been organized to manufacture a patented ventilating device and other sheet metal specialties and to do general sheet metal work. Testing and experimental work are practically completed, and manufacturing will probably begin in the early fall. Arthur Miller is president.

Sachs Bearings, Inc., representative in the United States and Canada of Fichtel & Sachs, A. G., Schweinfurt-on-Main, Germany, manufacturer of ball and roller bearings, steel balls and coaster brakes, has opened an office at 114 Liberty Street, New York.

New England

BOSTON, July 18.

SALES of new and used tools reported in this market the past week were few and unimportant. There are perhaps a half dozen fairly large new tools under active negotiation, and the market appears to have more life, but it is still quiet. New England metal-working shops in general are working on reduced schedules and with smaller forces, although the resumption of a Lowell textile machinery plant brings the average for the week slightly higher. There is little in view to suggest much increase in machine tool activity the remainder of this month or in August.

Small tools are moving better than a week ago, but business is far from brisk. June was a poor month for riveting tools, electric drills and kindred equipment, and the first half of July was also dull. Sales for the year to date, however, are ahead of those for the corresponding period last year.

Work will start at once on a two-story, 38 x 100 ft., addition to the factory of the Interior Building Finish Co., 154 Everett Avenue, Chelsea, Mass. Plans are private.

Stone & Webster, Inc., Boston, has been given a contract by the Atmospheric Nitrogen Chemical & Dye Corporation, to erect a steam-electric generating plant to cost \$8,500,000, and other plant units, the whole to cost \$25,000,000. Completion will be in 1929.

The Goodrich Falls Power Station, Fryeburg, Me., which supplies electric current to North Conway, Intervale, Bartlett and Jackson, N. H., was burned last week when struck by lightning. Plans are under way for a new plant.

John D. Scott has obtained a lease of the plant of the Connecticut Electric Steel Co., Hartford, Conn., with option to purchase, and the plant, which has been closed since 1920, will be put in immediate operation for the production of high-grade steel castings and special steels. Mr. Scott is a metallurgist, having been graduated from the University of Pittsburgh. He spent some years with the old Black Diamond Steel Works at Pittsburgh, of which his father was manager. During the war Mr. Scott installed

and operated two electric furnaces at Detroit. Since the war he has been connected with the International High Speed Steel Co. and the Collins Co., Collinsville, Conn. The plant will be operated under Mr. Scott's name for the present. It will employ 30 men at the outset, but it is expected that this will soon be increased to 100.

Bids have been asked on a general contract by the Meisel Press Mfg. Co., 944 Dorchester Avenue, Boston, manufacturer of printing presses and parts, for a one- and two-story addition, 100 x 225 ft., to cost in excess of \$75,000 including equipment.

The Alden Mfg. Co., Springfield, Mass., has completed a new mechanism, known as the phono-radio, combining in a single unit a radio set and talking machine with a number of refinements, and will devote a large portion of its plant to the new device. It is expected to expand facilities.

The Connecticut Specialties Co. has taken over the plant of the Rowe Calk & Chain Co., Plantsville, Conn., for the manufacture of a line of mechanical products.

J. P. Morrissey, 19 Massasoit Street, Waltham, Mass., is considering the construction of a new cold storage and refrigerating plant to cost more than \$65,000 with equipment.

The Heil Co., 1230-50 Twenty-sixth Avenue, Milwaukee, manufacturer of auto truck hoists, iron and steel tanks, etc., has rejected bids recently received for its one-story factory branch, storage and distributing plant at Brighton, Boston, and will have revised plans drawn at once. Krug & Smith, 69 East Wisconsin Avenue, Milwaukee, are architects. Local headquarters of the company are at 298 North Harvard Street, Brighton.

The Windsor Locks Mills, Inc., Windsor Locks, Conn., has been formed by officials of J. L. N. Smythe, 30 South Sixth Street, Philadelphia, manufacturer of paper goods, to take over the former Windsor Locks mill of the Whittelsey Paper Co. John R. Draper, formerly connected with the Carthage Pulp & Paper Co., Carthage, N. Y., will be general manager. The property will be operated under the direction of Arthur D. Little, Inc., 30 Charles River Road, Cambridge, Mass, engineer.

The Union Motor Sales Co., 40 Fourth Street, Chelsea, Boston, will soon begin the erection of a new one- and two-story machine and repair shop, service and sales building, to cost about \$75,000 with equipment.

The Boston & Maine Railroad Co., North Station, Boston, has awarded a general contract to the Tredennick-Billings Co., 10 High Street, for a new engine house and repair shop, 80 x 196 ft., at Springfield, Mass., to cost about \$75,000 with equipment.

The Connecticut Co., New Haven, Conn., operating public utilities, has plans for a one-story addition to its motor bus service, repair and garage building, 30 x 200 ft., to cost more than \$65,000 with equipment. R. W. Foote, New Haven, is architect.

The P. I. Perkins Co., 110 High Street, Boston, has been appointed representative in that territory for the Pennsylvania Pump & Compressor Co., Easton, Pa., manufacturer of air compressors and vacuum, centrifugal and air lift pumps.

Philadelphia

PHILADELPHIA, July 18.

CONTRACT has been let by the R. H. Hood Co., Nineteenth and Westmoreland Streets, Philadelphia, manufacturer of textile machinery and parts, to E. E. Hollenback, Inc., for a one-story addition, 50 x 76 ft., to cost about \$21,000 with equipment.

Samuel Yeflin, Philadelphia, operating a sheet metal works at 5520 Arch Street, has asked bids on a general contract for a two-story and basement addition, 35 x 100 ft., to cost about \$25,000 with equipment.

Ruttie, Shaw & Wetherill, 1233 Cherry Street, Philadelphia, operating a linotype plant, have taken title to the two-story factory at 1217-19 Cherry Street and will use for expansion.

The Scott Paper Co., Chester, Pa., has concluded arrangements for the purchase of the Charleston Mills at Nova Scotia, heretofore owned by the Nova Scotia Pulp & Paper Co. The Scott company will continue the operation of the plant and is said to be planning for expansion. It will be used primarily for pulp supply for the converting mills of the company at Chester.

Louis Myers, Memphis and Westmoreland Streets, Philadelphia, operating a metal plant, has filed plans for a new one-story machine shop, for which a general contract has been let to Mariani Summastano, 3207 Memphis Street.

Daniel J. Keating, 2042 Rittenhouse Street, Philadelphia, plumbing and heating equipment, has awarded a general contract to G. W. Wagoner, 909 South Twenty-fifth Street, for a one and two-story and basement addition, 45 x 100 ft.,

The Crane Market

VERY little new inquiry has appeared in the past week either for overhead or locomotive cranes and only a few purchases are reported. The Todd Shipyards Corporation, 25 Broadway, New York, is reported to be in the market for a 5-ton electric overhead crane. Locomotive crane inquiry continues light.

Among recent purchases are:

Whitney Brothers Co., Duluth, Minn., a 30-ton standard locomotive crane from the American Hoist & Derrick Co.

Byllesby Engineering & Management Corporation, Chicago, a combination $\frac{3}{4}$ -cu. yd. shovel and locomotive crane, electrically operated, from the American Hoist & Derrick Co.

Parklap Contracting Co., Buffalo, a 12-ton crawl-tread locomotive crane from the Northwest Engineering Co.

Delta Construction Co., 60 Wall Street, New York, a 100-ton, 80-ft. span, 6-motor power house crane for Kansas from the Milwaukee Electric Crane & Mfg. Corporation.

Wright Aeronautical Corporation of America, Paterson, N. J., a 1½-ton, 19-ft. span, single I-beam hand power crane from the Box Crane & Hoist Corporation.

Union Electrical Light & Products Co., Unionville, Conn., a 10-ton, 35-ft. span hand power crane from the Box Crane & Hoist Corporation.

National Biscuit Co., 85 Ninth Avenue, New York, two 2-ton, 16-ft. 6-in. span hand power cranes for Evanston, Ill., from the Box Crane & Hoist Corporation.

Gulf Refining Co., Atlanta, Ga., a 5-ton, 37-ft. 8-in. span, 1-motor overhead crane from the Box Crane & Hoist Corporation.

Sanderson & Porter, New York, a 7½-ton, 25-ft. span hand power crane for Claremont, W. Va., from the Box Crane & Hoist Corporation.

Stone & Webster, Inc., Boston, a 30-ton power house crane for Hartford, Conn., from the Niles Crane Corporation.

to cost close to \$40,000 with equipment. The Ballinger Co., 105 South Twelfth Street, is architect and engineer.

The United Gas Improvement Co., Broad and Arch Streets, Philadelphia, operating electric light and power and other utilities, is planning for an increase in capital from \$101,826,400 to \$106,504,400, a portion of the proceeds to be used for expansion in properties and in light and power facilities. Part of the fund will be used for the purchase of the electric utilities recently acquired through Day & Zimmermann, Inc., Sixteenth and Chestnut Streets, lately taken over.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, is having plans drawn for a new power substation at Plymouth Meeting, Pa., to cost upward of \$40,000 with equipment. John T. Windrim, Commonwealth Trust Building, Philadelphia, is architect.

The Reading Co., Reading Terminal, Philadelphia, has asked bids on a general contract for a new engine shop at Shamokin, Pa., with repair facilities. Clark Dillenbeck is company architect and engineer.

The Safepack Mills, Inc., Millis, Mass., manufacturer of waterproof paper products, has taken over a three-story building at 217 Walnut Street, and will occupy for a new factory branch, storage and distributing plant.

The Golding Sons' Co., Globe Bank Building, Trenton, N. J., operating feldspar and flint properties, has awarded a general contract to the C. J. Smith Construction Co., 204 Academy Street, for its proposed new grinding mill on New York Avenue, with main unit, one story, 66 x 75 ft., to cost close to \$200,000 with equipment. W. E. S. Dyer, Land Title Building, Philadelphia, is engineer.

G. Howard Mitchell, 7800 Frankford Avenue, Philadelphia, automobile dealer, has awarded a general contract to M. E. Rodgers, 7732 Cottage Street, for a one-story machine and repair shop, 50 x 75 ft.

The Samuel M. Langston Co., Sixth and Jefferson Streets, Camden, N. J., manufacturer of paper-cutting machinery, etc., has awarded a general contract to Fearn & Voegtlin, Camden, for a two-story addition to cost more than \$45,000 with equipment.

The Mack International Motor Truck Co., Woodland Avenue and Forty-second Street, Philadelphia, with main plant at South Plainfield, N. J., is said to be planning the construction of a new two-story factory branch, service, repair and sales building at Chester, Pa., to cost close to \$175,000 with equipment. Headquarters are at 25 Broadway, New York.

The Certain-teed Products Corporation, Second Street and Erie Avenue, Philadelphia, manufacturer of roofing products, etc., is arranging for an increase in capital from 500,000 to 1,000,000 shares of stock, no par value, a portion of the proceeds to be used for expansion in production facilities, including the acquisition of other companies. R. M. Nelson is secretary.

The Borough Council, Summit Hill, Pa., is planning the installation of a pumping plant in connection with extensions in the sewage system. The entire project will cost about \$90,000. R. E. Shinton, care of the Lehigh Coal & Navigation Co., Lansford, Pa., is engineer.

The Carbice Corporation of America, Inc., Philadelphia, manufacturer of ice by a carbon dioxide process, has arranged for the establishment of a new plant at 834 North Third Street. W. E. Ditmars is president; Donald W. Drummond will be in charge of plant operations.

The Saylor Baking Co., Tamaqua, Pa., is planning to rebuild its plant destroyed by fire July 9, with loss close to \$50,000 with equipment.

Milwaukee

MILWAUKEE, July 18.

MACHINE tool business continues quiet, with no orders of outstanding significance. Inquiry is moderate but presages no large volume of new business, and is almost wholly for replacement. An encouraging feature, however, is that industrial construction is increasing in this locality after a considerable period of dormancy, and more buying activity is confidently looked for by dealers.

The Hamilton Metalplane Co., Milwaukee, has been incorporated in Wisconsin with \$275,000 capital stock to engage in the construction and operation of aircraft. Prominent business men are the principals and include Clarence R. Falk, secretary-treasurer Falk Corporation; Phillip A. Koehring, secretary-treasurer Koehring Corporation, and president Milwaukee Association of Commerce; Col. S. B. Way, president Milwaukee Electric Railway & Light Co., and others. The organization has been established to insure, if possible, the location of a plant in Milwaukee, against Detroit competition, for manufacturing the Hamilton all-metal monoplane on a commercial scale. A Hamilton ship won second place in the annual Ford reliability tour ended July 12. It was built by Thomas F. Hamilton in the plant of the Hamilton Aero Mfg. Co., Milwaukee, specializing in the production of propellers and other parts.

The Merrill Machinery & Supply Co., Merrill, Wis., is converting its former foundry building into a shop to house a new department manufacturing wire goods. Equipment is being purchased both for forming and for the production of tools and dies for the new shop. W. A. Talcott, formerly of South Bend, Ind., has been engaged as manager of the department.

The Young Radiator Co., Racine, Wis., has been incorporated to manufacture automobile, truck and tractor radiators, cooling systems, condensers, etc. It is capitalized at \$125,000 of 7 per cent preferred stock and 2500 shares of common without par value. The principal is Fred W. Young, formerly general manager Racine Radiator Co., which is building a new plant costing \$150,000 in Milwaukee and will transfer the operation from Racine to Milwaukee about Sept. 1. The new company is buying complete equipment for a plant to be established in an existing factory at Racine.

The American Appliance Corporation, West Bend, Wis., recently incorporated with \$100,000 capital stock, has leased the plant of the defunct Barton Axle Co., at Barton, for the manufacture of electric washing machines and other household appliances. Arthur H. Lablskey is president and general manager.

The Common Council, Fond du Lac, Wis., is taking bids until Aug. 2 for the complete construction and equipment of a sewage disposal plant designed by Alvord, Burdick & Howson, consulting engineers, Chicago, and estimated to cost \$100,000. C. J. Fay is city clerk, and George H. Stanchfield is city engineer.

The Milwaukee Forge & Machine Co., 340 East Oklahoma Avenue, Milwaukee, has broken ground for a one-story brick and steel machine shop addition, 45 x 100 ft. An investment of \$30,000 in building and equipment is planned. R. W. Roberts is president.

The Milwaukee Woodwork & Pattern Co., Milwaukee, has been incorporated with \$25,000 capital to take over and continue a business conducted for several years by August and Fred Kornburger, 1371 Thirty-fourth Street, and asso-

ciates. Plans are being made to enlarge the plant and increase the equipment.

The Kenosha Fire Engine & Truck Co., Kenosha, Wis., has sold its plant and business to H. P. Olsen, 501 Cherry Street, Milwaukee, and associates, for \$50,000. The plant occupies the greater part of the shops of the defunct Winther Motor Truck Co., Kenosha. Ralph Mock is president, and J. V. Faith, vice-president.

The Wisconsin Traction, Light, Heat & Power Co., 112 East College Avenue, Appleton, Wis., has plans for a private garage and general machine and service shop to cost about \$40,000. Construction will start immediately.

The Common Council, Menasha, Wis., expects to be ready for bids Aug. 15 for the construction and equipment of a municipal filtration plant with a capacity of 2,000,000 gal. and estimated to cost \$100,000. The A. E. McMahon Engineering Co., local, is completing plans. John Jedwabny is city clerk.

The Trempealeau County, Wis., Highway Committee closed bids July 15 for the construction of a brick and concrete machine shop, 40 x 120 ft., for servicing its road construction and maintenance equipment. It will cost about \$30,000 complete. Emil F. Rotering is County highway commissioner.

Chicago

CHICAGO, July 18.

INQUIRY for machine tools has come out in increased volume the past week, but railroad activity is light. Buying consisted largely of special machines and scattered items. Sales on the whole, however, are lighter than a week ago and indications are that the July volume of business will show a considerable decrease compared with June.

A Wisconsin user purchased two 20-in. shapers and a milling machine. It is reported that two Northwestern railroads may issue a list within the next 30 days. The Chicago, St. Paul, Minneapolis & Omaha has deferred action on its inquiry for an indefinite period, and the Rock Island inquiry for a dozen items is still pending. The Santa Fe list is practically closed, but it is understood that that road will purchase several milling machines. Recent bidding has brought out some concessions in prices in several lines.

The Battery Equipment & Supply Co., 1640 South Wabash Avenue, Chicago, has asked bids on a general contract for a new one and two-story plant to cost upward of \$100,000 with equipment. A. A. Schwartz, 720 North Michigan Avenue, is architect.

The R. S. Bacon Veneer Co., 4700 Augusta Avenue, Chicago, has filed plans for a new two-story plant, 91 x 170 ft., to cost close to \$200,000 with equipment, for which a general contract recently was let to C. Rasmussen, 77 West Washington Street. F. E. Davidson, 53 West Jackson Boulevard, is architect.

The American Steel & Wire Co., De Kalb, Ill., is said to be planning to rebuild the portion of its local plant recently destroyed by fire, with loss reported in excess of \$100,000 including equipment.

The Luley Abattoir Co., 567 North Cleveland Avenue, St. Paul, Minn., has plans maturing for a new cold storage and refrigerating plant to cost \$150,000 with machinery. A. F. Gauger, Exchange Bank Building, is architect.

Sidney Laner & Co., 219-21 West Lake Street, Chicago, manufacturers of billiard tables and equipment, are reported to be planning to rebuild the portion of their plant destroyed by fire July 8, with loss estimated at close to \$100,000 including equipment.

The F. J. Lewis Mfg. Co., 2513-15 South Robey Street, Chicago, manufacturer of roofing, has plans under way for an addition to cost more than \$40,000 with equipment. William D. Works, 140 South Dearborn Street, is architect.

The Imperial Machine Co., 1611 Central Avenue, Chicago, has filed plans for a new one-story machine shop, 40 x 150 ft., for which a general contract has been let to Milton Goldstein, 1406 West Lake Street.

The Sioux City Gas & Electric Co., Sioux City, Iowa, has plans under way for a new two-story automobile service, repair and garage building, 150 x 225 ft., to cost upward of \$200,000 with equipment.

The Montana Concrete Products Co., Helena, Mont., is planning for the early erection of a new plant for the manufacture of reinforced concrete pipe and other kindred specialties, to cost about \$25,000 with equipment.

The Johnson & Meier Co., 155 Wendell Street, Chicago, manufacturer of wrought iron products, ornamental iron specialties, etc., is considering the construction of a new one-story plant, 125 x 150 ft., on site recently acquired at

919-27 West North Avenue, to cost upward of \$75,000 with equipment.

The Board of Education, Rock Island, Ill., is planning the installation of manual training equipment in a proposed new three-story high school to cost more than \$800,000, for which plans are being drawn by Cervin, Horn & Stuhr, Safety Building, architects.

The Hyman-Michaels Co., Chicago, has purchased the former oil refinery and tank farm of the Indianola Refining Co., East St. Louis, Ill., consisting of complete cracking and refining equipment, gasoline plant, power plant and oil storage tanks. The plant will be dismantled and the equipment sold.

The F. W. Lucke Brick Co., 133 West Washington Street, Chicago, has been appointed representative in that territory for the Ironton Fire Brick Co., Ironton, Ohio, maker of refractory brick from Olive Hill, Ky., clays.

The Sheets-Rockford Silver Co., Rockford, Ill., has purchased property at 1008 Mulberry Street and contemplates an addition to its plant. R. W. Sheets is president of the company.

The Frank Foundries Corporation, Moline, Ill., will erect warehouses and storage buildings on a recently acquired factory site in that city, and will soon begin work on a new foundry unit which will have, when completed, a total floor space of 40,000 sq. ft. It will be erected in sections as business warrants.

The Calkins-Cole Mfg. Co., Loomis and Buchanan Streets, Rockford, Ill., has been organized to manufacture a portable motor-driven saw. Miles A. Calkins, its inventor, is president.

Cincinnati

CINCINNATI, July 18.

THE downward trend of machine tool sales continued the first half of July, new bookings having failed to attain the volume reached in the early part of June. Buying on a sizable scale is practically at a standstill, and orders and inquiries are principally from small shops for replacement purposes. Business placed by automobile manufacturers and railroads has been of negligible proportions. In keeping with slack conditions at the moment, several builders have cut their working forces. The New York Central is expected to buy two 18-in. engine lathes.

The tools and machinery of the Scott-Spencer Automatic Tool Co., 4607 Eastern Avenue, Cincinnati, were sold at auction July 15. The company recently was declared bankrupt and W. B. Mente was appointed trustee-in-bankruptcy.

The Superior Cement Co., heretofore a branch of the Wellston Iron Furnace Co., Wellston, Ohio, has been incorporated as a separate company to manufacture building materials. The officers will remain the same as those of the Wellston Iron Furnace Co., with S. E. Stephenson as president.

Bids are being asked by the Hamilton Caster & Mfg. Co., Dixie Highway, Hamilton, Ohio, for its one-story addition to cost close to \$40,000 with equipment. George Barkman, Reilly Building, is architect. John Welgel is president.

The Boulevard Garage & Service Co., Dunlap Street, Cincinnati, has plans under way for a new three-story service, repair and garage building, with capacity of 150 cars, to cost in excess of \$100,000 with equipment.

The Board of Trustees, Ohio State University, Columbus, is preparing plans for a new one-story power house to cost \$115,000 with equipment. J. N. Bradford, Ohio State University, is architect.

The Tennessee Light & Power Co., Springfield, Tenn., formerly known as the Davidson Light & Power Co., will make extensions and improvements in its power plant and system to cost about \$50,000 including transmission lines.

The L. W. Hancock Engineering Co., Louisville Trust Building, Louisville, has taken a contract for the erection of a one-story and basement factory, 200 x 200 ft., for the Bessire Realty Co., Louisville, to be occupied by a company, name temporarily withheld, for the manufacture of bakers' equipment and supplies. It will cost about \$100,000.

The Holston Quarry Co., Inc., Strawberry Plains, Tenn., has inquiries out for a revolving steam shovel of crawler type, about 2-yd. capacity.

The Wheelersburg Woodenware Co., Wheelersburg, Ohio, has asked bids on a general contract for a new two-story and basement plant, 60 x 165 ft., to cost close to \$60,000 with equipment. Taylor & Kenny, Portsmouth, Ohio, are architects.

The Bryant Motor Co., Broad Street, Chattanooga, Tenn., has tentative plans for a new multi-story service, repair

and garage building, with capacity of 250 cars, to cost \$100,000 with equipment.

The McGowan Pump Co., Central Avenue, Cincinnati, Ohio, will proceed with superstructure for a new plant at Ironton, Ohio, to cost about \$65,000 with equipment.

The Board of Education, Knoxville, Tenn., is said to be planning the installation of manual training equipment in its new Austin High School to cost upward of \$200,000, for which bids are being received on a general contract until July 25. Bauman & Bauman, Market Street, are architects.

The Clifton Machinery Co., formerly at 1224 West Eighth Street, Cincinnati, has been removed to 1023 West Sixth Street.

Buffalo

BUFFALO, July 18.

CONTRACT has been let by the J. P. Danielson Co., Inc., 583 Allen Street, Jamestown, N. Y., manufacturer of wrenches, etc., to P. Anton Peterson, 108 Charles Street, for a one- and two-story addition to cost about \$55,000 with equipment. O. R. Johnson, Fenton Building, is architect.

The Rochester Gas & Electric Corporation, Rochester, N. Y., is completing plans for the early construction of a power dam and hydroelectric generating plant at the Genesee Gorge, near Mount Morris, N. Y. The entire project, with steel tower transmission line, will cost close to \$10,000,000.

The Remington-Rand Corporation, North Tonawanda, N. Y., comprising a recent merger of the Remington Typewriter Co., with main plant at Ilion, N. Y., and the Rand Kardex Bureau, North Tonawanda, manufacturer of filing equipment and devices, has completed arrangements for the acquisition of the Remington Noiseless Typewriter Co., 374 Broadway, New York, and the Kalamazoo Loose Leaf Binder Co., Kalamazoo, Mich., and will consolidate with its organization. Plants of the two purchased companies will be continued in operation as heretofore. Benjamin L. Winchell is chairman of the board.

Bids will soon be asked by the General Railway Signal Co., end of West Avenue, Rochester, for a new three-story building to cost close to \$100,000. Gordon & Kaebler, 311 Alexander Street, are architects.

The Quaker City Cooperage Co., Hamburg and Republic Streets, Buffalo, is considering the rebuilding of the portion of its plant destroyed by fire July 11, with loss reported upward of \$125,000 including machinery.

The Fire & Marine Equipment Corporation, Clayton, N. Y., has been formed by a merger of the Phillips Fire Pump Co. and the St. Lawrence River Motor Machine Co. and will manufacture the St. Lawrence marine motor and the Phillips fire pump. The company also plans to build 400-, 600- and 800-gal. pumping units mounted on a commercial chassis. Operations will be under way about Aug. 1, and the company will be in the market for materials and equipment.

The Roberts Gas Burner Co., Jackson Building, Buffalo, has been organized to manufacture gas burners, primarily for house heating. Arrangements for manufacturing have been completed.

South Atlantic States

BALTIMORE, July 18.

PLANs are being prepared by the C. Hoffberger Co., 538 East Monument Street, Baltimore, for a new six-story and basement cold storage and refrigerating plant, totaling about 75,000 sq. ft. of floor space, to cost close to \$400,000 with equipment.

The Board of District Commissioners, District Building, Washington, is asking bids until Aug. 1 for one air compressor.

The Jefferson Power & Light Co., Jefferson, N. C., is planning the purchase of equipment for installation in a local water power generating plant, including a 700-hp. water-wheel, 700-hp. electric generator with accessories, line equipment, etc. S. A. Lawrence is president.

The City Council, Danville, Va., is planning extensions and improvements in the municipal artificial gas plant, to cost close to \$50,000 including equipment.

The American Aeronautic & Speed Boat Corporation, Virginia Beach, Va., care of Louis Siegel, Roland Court Building, Atlantic Avenue, president, is concluding negotiations for the purchase of property at the Bird Neck Point, for the establishment of a new airport, with hangars, shops and other structures.

The Southern Railway, Charlotte, N. C., G. L. Sitton, chief engineer, has plans under way for a new locomotive terminal and shops in the vicinity of Winston-Salem, N. C., including engine house, machine shop, planing mill, metal-working shop, power house and other buildings, with 100-ft. elec-

trically-operated turntable. The company has a tract of more than 70 acres for the plant. It is expected to award general contracts on buildings soon. The entire project is reported to cost more than \$350,000.

The Sil-a-Site Corporation of Georgia, Inc., A. B. Reynolds, president, Atlanta, Ga., recently organized to manufacture building materials, is said to have acquired property on the Sylvan Road, Oakland City, Ga., as a site for a new plant, to cost close to \$100,000 with equipment.

The Charlton County Power Co., Folkston, Ga., has plans under way for a new local light and power plant, and electrically-operated ice-manufacturing plant, to cost close to \$100,000 with equipment. Early purchase will be made of a Diesel oil engine unit and accessory equipment and a complete ice-manufacturing unit.

The Town Council, Williamsport, Md., is planning the installation of pumping equipment in connection with a proposed municipal water system to provide for a daily capacity of 200,000 gal. The entire project will cost about \$100,000. Witman, Requardt & Smith, 18 East Lexington Street, Baltimore, are architects and engineers.

The Goodman Sales System, Inc., 3101 Greenmount Avenue, Baltimore, is making inquiries for a folding machine to handle paper 25 x 38 in.

The City Council, Gastonia, N. C., is asking bids until July 29 for equipment for extensions in the sewage disposal plant, including gas engine-driven generating unit, air compressor, screening plant, etc. William M. Platt, Durham, N. C., is engineer.

The Oil Burning Equipment Co., 1010 Vermont Avenue, Washington, has been organized to manufacture oil burners and oil burning equipment and is in the market for gray iron castings.

Pittsburgh

PITTSBURGH, July 18.

THE past week has been very quiet in machine tools in this market, but the month's business to date has made a good showing. Most dealers report pending lists of fair size and good promises, but as usual at this time of year buyers are disposed to let purchases wait.

Local dealers participated in the distribution of some 14 items recently purchased by the Weirton Steel Co., including three lathes, one shear knife grinder, horizontal table type, boring mill, upright drill, milling machine, radial drill, one shaper, one planer-shaper and a 36-in. open-side planer. The company still has a number of tools to buy but an appropriation has not yet been voted. The pattern shop of the American Sheet & Tin Plate Co. at McKeesport was burned recently and the company is in the market for a few wood-working machines.

Plans are said to be maturing for a merger of the Standard Underground Cable Co., Seventeenth and Pike Streets, Pittsburgh, and its subsidiary, the Standard Underground Cable Co. of Canada, with the Safety Cable Co., 114 Liberty Street, New York, and its subsidiary, the Phillips Wire Co., Pawtucket, R. I. The consolidation will also include the Habirshaw Cable & Wire Corporation, 10 East Forty-third Street, New York, as well as a plant of the American Smelting & Refining Co., 120 Broadway, New York, devoted to a kindred line of production. It is understood that all plants will be continued under the consolidation plans, with a program for expansion and development.

The Grennan Bakeries, Inc., 6016 Rodman Street, Pittsburgh, is reported to be planning the construction of a new plant on property, 260 x 305 ft., in the Point Breeze district.

The Standard Ultramarine Co., Twenty-fourth Street and Fifth Avenue, Huntington, W. Va., has awarded a general contract to the Huntington Iron Works, 831 Adams Avenue, for a one-story addition, 34 x 75 ft. Additional machinery will be installed.

The Board of Education, Woodlawn, Pa., has plans for a new one-story manual training shop at the Harding High School, and will soon begin superstructure. Carlisle & Sharrer, Martin Building, Pittsburgh, are architects.

The West Virginia Power Co., Charleston, W. Va., is considering the construction of a hydroelectric power development on the Kanawha River, near Huntington, W. Va., consisting of two generating stations with a capacity of 50,000 hp.

Graff Brothers, Inc., 5912 Penn Avenue, Pittsburgh, hardware products, has awarded a general contract to A. F. Galley, 6468 Frankstown Avenue, for a new two-story storage and distributing plant, to cost close to \$45,000 with equipment. W. K. Beltz, 146 Sixth Street, is architect. George Graff is head.

St. Louis

ST. LOUIS, July 18.

BIDS have been asked by the Messmer Mfg. Co., 2700 South Seventh Street, St. Louis, manufacturer of brass and bronze castings, for a two-story foundry addition, to cost about \$30,000 with equipment. O. J. Krieg, Wainwright Building, is architect.

The Springfield Gas & Electric Co., Springfield, Mo., has arranged for a bond issue of \$3,600,000, a portion of the fund to be used for expansion and improvements in power plants and system. The company has taken over the Springfield Electric Co. and the Springfield Traction Co.

Sefton, Inc., 59 East Madison Street, Chicago, manufacturer of fiber and paper containers, cartons, etc., has taken over the plant and business of the St. Louis Paper Can & Tube Co., 3275 Big Bend Road, Maplewood, St. Louis, and will operate in the future as the Sefton National Fiber Can Co. Plans are under way for enlargements, with installation of equipment to develop a capacity of about 8,500,000 fiber cans and boxes, and 1,000,000 tubes per month. The purchasing company is said to be arranging a preferred stock issue of \$200,000, a portion of the fund to be used for expansion.

The Bluff City Mfg. Co., Poplar Bluff, Mo., manufacturer of chairs, etc., is considering the establishment of a new plant at Paragould, Ark., to cost about \$25,000 with equipment.

The Polar Wave Ice & Fuel Co., Grand and Olive Streets, St. Louis, has awarded a general contract to the Fruin-Colnon Contracting Co., Merchants Laclede Building, for a one-story ice plant to cost \$100,000. H. G. Clymer, Wainwright Building, is architect.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has plans under way for the erection of a new steam-operated electric generating station at Karrahn, near Oklahoma City. The company is planning, also, for extensions and betterments in existing power stations, with installation of generating and other equipment.

An electric generating plant will be constructed by the Pet Milk Co., Arcade Building, St. Louis, at its proposed evaporated milk plant at Greenville, Tenn., to cost close to \$200,000, of which more than \$100,000 will be expended for machinery. Other equipment to be installed will include pumps, air compressors, boilers, etc., and machinery for an ice-manufacturing and refrigerating plant. Helfensteller, Hirsch & Watson, Chemical Building, St. Louis, are architects.

The Board of Public Service, St. Louis, is asking bids until July 26 for three 500-hp. boilers and accessories for installation in the municipal service building; also for three chain grate stokers for boiler units.

The Lincoln Aircraft Corporation, Lincoln, Neb., has acquired a controlling interest in the Swallow Airplane Co., Wichita, Kan., with local plant now given over to the manufacture of monoplanes. The new owner plans increased output at the acquired factory, primarily for assembling.

The Board of Education, Tulsa, Okla., has plans under way for a new vocational school, to cost about \$125,000 with equipment, for which bids will soon be asked on a general contract. Leland I. Shumway, Alexander Building, is architect.

The City Council, Osceola, Ark., plans extensions and improvements in the municipal electric light and power plant, including the installation of additional equipment, with 3-ton traveling crane. The expansion is estimated to cost about \$30,000.

Indiana

INDIANAPOLIS, July 18.

BIDS will soon be asked by the Ligonier Refrigerator Co., Ligonier, Ind., manufacturer of refrigerating equipment, for a new three-story plant, to cost close to \$100,000 with machinery. A. M. Strauss, Cal-Wayne Building, Fort Wayne, Ind., is architect.

The Ross Power Equipment Co., Merchants' Bank Building, Indianapolis, machinery dealer, has inquiries out for a full Diesel oil engine, about 90-hp. capacity, complete with accessories.

The South Bend Toy Mfg. Co., 1012 High Street, South Bend, Ind., is reported to be considering the construction of a new one-story plant. H. S. Badet is treasurer, in charge.

The Indiana Electric Corporation, Indianapolis, has been organized to take over and consolidate the Central Indiana Power Co., Indianapolis, and the Terre Haute, Indianapolis & Eastern Traction Co., Terre Haute, Ind. Application for permission to carry out the merger has been made, as well as for a security issue to total \$13,165,000, a portion of the proceeds to be used for expansion.

The Curtain Supply Co., Elkhart, Ind., manufacturer of fastening equipment and kindred specialties, has awarded a general contract to the R. Sollitt Construction Co., South Bend, Ind., for a one-story addition, 200 x 350 ft., to be used as a foundry and machine shop, and to cost approximately \$200,000 with machinery. Mundie & Jensen, 39 South La Salle Street, Chicago, are architects.

The Board of Education, Muncie, Ind., is said to be planning the installation of manual training equipment in a three-story addition to the junior high school to cost \$175,000, for which bids have been asked on a general contract. Houck & Smenner, 108 East Washington Street, are architects.

The Bendix Brake Co., 401 Bendix Drive, South Bend, Ind., manufacturer of automobile brakes and kindred equipment, is reported to be planning a one-story addition to cost close to \$50,000, including equipment.

Gulf States

BIRMINGHAM, July 18.

AN expansion program is being arranged by the Oil Belt Power Co., Eastland, Tex., to cost close to \$400,000. The work will include enlargements in the steam-operated electric generating plant about four miles from the city, with installation of 15,000-kw. turbo-generator, boilers and accessory equipment. J. E. Lewis is vice-president, in charge.

The Stover Lumber Co., Mobile, Ala., is planning the construction of a new one-story lumber and planing mill, 65 x 200 ft., with power house, to cost about \$70,000, to replace a works recently destroyed by fire. Harry Stover is president.

The Amarillo Clay Products Co., 609 Taylor Street, Amarillo, Tex., recently organized to construct and operate a local brick manufacturing plant, is planning the early purchase of machinery, including stiff mud brick machines, dry kilns, repress for fire brick service, and other equipment.

The Board of Education, Harrisburg, Tex., is planning the installation of manual training equipment in a proposed new junior high school for which a fund of \$400,000 has been approved. J. O. Webb, Board of Education, is in charge.

The Opelika Ice Co., Opelika, Ala., recently organized, is planning the early construction of a new electrically-operated ice-manufacturing plant to cost close to \$50,000 with equipment. C. B. Romberg, Gainesville, Ga., and H. W. Caldwell, LaGrange, Ga., head the company.

E. S. Kepler, Fort Myers, Fla., is desirous of getting in touch with manufacturers of power grinding equipment, suitable for sharpening blades for safety razors.

The M. R. Adams Automobile Co., 7109 Fourth Street, Meridian, Miss., is planning the construction of a new three-story service, repair and garage building, 100 x 275 ft., to cost close to \$150,000. M. R. Adams is president.

The Long-Lewis Hardware Co., 2014 Second Avenue, Bessemer, Ala., has plans under way for a new branch storage and distributing plant at Smith Park, Birmingham, to cost about \$65,000 with equipment. Denham, Van Keuren & Denham, Age-Herald Building, Birmingham, are architects.

The Pea River Power Co., Troy, Ala., has secured permission to issue bonds in amount of \$250,000, a portion of the proceeds to be used for extensions and improvements in power plants and system, including transmission line construction.

The Chamber of Commerce, Wortham, Tex., is at the head of a project to establish a local airport on an 80-acre tract recently acquired, to include the construction of hangars, shops and other buildings.

The Kansas City, Mexico & Orient Railway Co., Wichita, Kan., has secured a tract of about 300 acres at Presidio, Tex., and is said to be planning the construction of new locomotive shops, including engine house, repair shop and other structures, to cost upward of \$85,000 with equipment.

The Board of City Commissioners, Jacksonville, Fla., is asking bids until Aug. 1 for automatic combustion control equipment for the municipal electric power plant; also for steel plate flues, breechings and stack; and for steel floor gratings. The Scofield Engineering Co., Commercial Trust Building, Philadelphia, is engineer.

The Natural Stone Fabrication Co., Runnels Street and the Belt Line Railway, Houston, Tex., is arranging for the erection of a new one-story plant, 180 x 200 ft., for the production of building stone, including cutting, grinding and polishing departments, to cost about \$40,000 with equipment.

The City Council, Shreveport, La., is planning the establishment of a municipal airport and has selected a tract of about 150 acres. It is purposed to construct two hangars, shop and other buildings. The entire project will cost about \$135,000. H. G. Barnes is city engineer; E. L. Wheelless, City Bank Building, is consulting engineer.

The City Council, Tuscaloosa, Ala., is considering the installation of power equipment and pumping machinery in connection with proposed extensions in the municipal water

system, using Little Yellow Creek as source of supply. The entire project is estimated to cost \$250,000. W. H. Nichol is city engineer.

The City Council, Amory, Miss., is asking bids until Aug. 2 for an electric generator and Diesel engine for the municipal power service. E. E. Cowley is city clerk.

The Mississippi Power & Light Co., Jackson, Miss., has acquired about five acres at Clarksdale, Miss., and is said to be planning the early construction of a new automatic power substation, to cost more than \$75,000 with equipment.

The Thrall Gin Co., Thrall, Tex., has inquiries out for a stationary gasoline engine.

The Reliable Sheet Metal Works, 334 South Miami Avenue, Miami, Fla., has been incorporated to do sheet metal work and deal in roofing. It is not in the market for equipment or materials.

Cleveland

CLEVELAND, July 18.

MACHINE tool business has been very light the past week, sales being confined to single machines, and there is not much new inquiry. With the summer lull evidently under way, the trade does not regard the outlook as very promising for the next few weeks. A few new inquiries have come out from plants figuring on contracts, but the placing of this business is contingent on securing these contracts. Little business is coming from Michigan automobile plants and not much activity in that field is looked for before fall. It is expected that the General Motors Truck Corporation will need some equipment for its new plant at Pontiac, Mich., but the requirements may not be large as this company now has a well equipped plant at East Moline, Ill.

Contract has been let by the Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, to the G. William Doerzback Co., 644 Camp Street, for a one-story foundry addition to cost close to \$35,000. J. E. Sweet is secretary.

The Iten Fiber Co., 2359 East Sixty-seventh Street, Cleveland, manufacturer of tubes, rods, sheets, etc., has awarded a general contract to George W. Pelton, 2448 Euclid Avenue, for a new one-story plant, 50 x 130 ft., to cost about \$45,000 with equipment.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded a general contract to the W. H. Hendrich Co., 2777 East Fifty-third Street, Cleveland, for a new three-story factory branch and distributing plant, 120 x 140 ft., at Cleveland, to cost close to \$200,000 with equipment.

The City Council, Akron, Ohio, has formed a committee to select a site for a proposed municipal airport, to include hangars, shops and other buildings, to cost more than \$250,000.

The Gallon Metallic Grave Vault Co., Gallon, Ohio, has awarded a general contract to the W. J. Schirmer Co., 1720 Euclid Avenue, Cleveland, for a one-story addition.

The Betz-Pierce Co., Cleveland, steel jobber, has taken over the sales in the northern Ohio territory of brass, bronze and aluminum castings made by the Pattern Castings Co., Cleveland.

Detroit

DETROIT, July 18.

BIDS have been asked by the Hudson Motor Car Co., 12601 East Jefferson Avenue, Detroit, for two additions, comprising a one-story structure, 200 x 500 ft., with foundations to carry additional floors later, and a four-story extension, 60 x 580 ft., to cost upward of \$500,000 including equipment. Albert Kahn, Inc., Marquette Building, is architect.

The American Nut Co., 676 West Grand Boulevard, Detroit, is planning an addition to its plant to cost in excess of \$50,000 with equipment. Charles Noble, Lafayette Building, is architect.

The Detroit Edison Co., 2000 Second Street, Detroit, is arranging for a bond issue of \$20,000,000, a portion of the proceeds to be used for expansion and betterments in power plants and system.

The Chevrolet Motor Co., Flint, Mich., a division of the General Motors Corporation, Detroit, is said to be planning an addition, work to start early in the fall, for sheet metal-working and motor production, to cost close to \$400,000 with equipment. The company recently has begun two additions, comprising a three-story parts division, 122 x 530 ft., and operating an office building, 60 x 260 ft. The structures are scheduled to be ready for service in October, and are reported to cost more than \$1,000,000 with equipment.

The Wayne County Board of Supervisors, Detroit, has authorized the establishment of a County airport on site recently selected at Dearborn. Hangars, shops and other buildings will be erected. It is purposed to arrange a bond issue of \$2,000,000 to carry out the project.

The American Brass & Iron Co., 6425 Crystal Street, Detroit, will soon begin the construction of a new one-story foundry and machine shop to cost more than \$60,000 with equipment. Pollmar & Ropes, 2533 Woodward Avenue, are architects.

The City Council, Allegan, Mich., is considering the construction of a municipal hydroelectric generating plant on the Kalamazoo River, to cost about \$450,000 with transmission system. It is purposed to arrange a bond issue for \$185,000 of the fund for initial work.

The Ditzler Color Co., 40 West Baltimore Avenue, Detroit, has plans under way for a new power house at its plant to cost more than \$40,000 with equipment. Weston & Ellington, Stroh Building, are architects. Thomas W. Connor is chairman of the board.

The Board of Education, North Adams, Mich., has authorized the installation of a manual training department in a new two-story high school, for which plans will be prepared by Billingham & Cobb, Pythian Building, Kalamazoo, Mich., architects.

The Bunte Brothers Tile Co., Telegraph Road, Flat Rock, Mich., is considering the installation of a coal-conveying system at its plant, for unloading from cars and conveying to bins.

The Wolverine Brass Works, Grand Rapids, Mich., has arranged for an increase in capital from \$1,000,000 to \$1,500,000, a portion of the proceeds to be used for expansion.

The Service Sales Co., Toledo, Ohio, has been appointed representative in the State of Michigan and in Toledo for the Neely Nut & Bolt Co., Pittsburgh. The Service company, which is composed of E. B. Treharne and C. E. Conover, has recently opened offices in the General Motors Building, Detroit.

The Eureka Brass Products Co., 1340 Front Avenue, Grand Rapids, Mich., has been organized to conduct a general brass, bronze and aluminum foundry. A plant has been acquired at the above address and the company is in the market for molding machines, flasks and general foundry equipment. George P. Maghielse, formerly production manager National Brass Co., Grand Rapids, and W. Snyder, recently associated with the J. T. Wing Co., Detroit, are the organizers.

Pacific Coast

SAN FRANCISCO, July 13.

THE Albatross Steel Equipment Co., Los Angeles, has awarded a general contract to John M. Cooper, Rives-Strong Building, for a new one-story plant, 150 x 250 ft., at Santa Monica, Cal., to cost about \$60,000 with equipment. Francis D. Rutherford, Mills-Fraser Building, Santa Monica, is architect.

The Valley Concrete Pipe & Products Co., Yuba City, Cal., has acquired property at Stege, Contra Costa County, Cal., as a site for a new plant for the manufacture of reinforced concrete pipe and other concrete specialties, to cost about \$45,000 with equipment. J. G. Williamson is vice-president.

The Board of Education, Santa Monica, Cal., is planning the early erection of a one-story manual training shop at the John Adams junior high school, to cost close to \$45,000 with equipment.

The Peck & Hills Furniture Co., 800 North Spring Street, Los Angeles, is completing plans for a new four-story and basement factory, 65 x 100 ft., at Spokane, Wash., to cost about \$100,000 with equipment.

The Grays Harbor Pulp Co., Hoquiam, Wash., will begin work on its proposed new pulp and paper mill, consisting of a number of units, to cost close to \$2,000,000 with equipment. V. D. Simons, 435 North Michigan Boulevard, Chicago, is consulting engineer.

The Everett Commercial Air Transport, Inc., Everett, Wash., is planning the establishment of a new airport on the site of the former local shipyard on the waterfront, including hangars, shops, oil storage building and other structures, to cost in excess of \$50,000. The company was organized recently with a capital of \$100,000.

The Reliance Mfg. Co., 1020 South Broadway, Pasadena, Cal., manufacturer of gas regulators and kindred equipment, has plans for a new one-story machine shop at Alhambra, Cal., to cost close to \$25,000.

The Board of School Trustees, Merced, Cal., has plans for a new one-story manual arts building at the local high school, to cost about \$35,000 with equipment. W. E. Bedesen, Merced, is architect.

Dodge Brothers, Inc., Stockton, Cal., with headquarters at Detroit, is planning the construction of an addition to

the local plant of its Graham Truck division on Cherokee Lane, to be one-story, 90 x 500 ft., to cost upward of \$150,000 with equipment. R. L. Houston is plant manager at Stockton.

The Juneau Cold Storage Co., Juneau, Alaska, has plans for a new two-story cold storage and refrigerating plant, 120 x 120 ft., to cost \$150,000 with machinery.

The Union Oil Co., Aberdeen, Wash., has plans under way for the construction of a new oil storage and distributing plant, including power house, pumping station, machine repair shop and other miscellaneous structures, with dock, 30 x 200 ft., to cost in excess of \$90,000 including equipment.

The Packard Motor Car Co., Hope Street, Los Angeles, operated by Earle C. Anthony, Inc., has revised plans under way for a four-story and basement service, repair and garage addition, 150 x 160 ft., to cost more than \$150,000. John and D. B. Parkinson, Title Insurance Building, are architects.

The Steel Tank & Pipe Co., Portland, Ore., will soon begin the manufacture of all steel service stations, made in standard units for quick assembling. The building will be 15 ft. or 19 ft. wide and available in any length.

The Tennent Steel Co., Portland, Ore., has been organized as a branch of the Tennent Steel Casting Co., Tacoma, Wash., and will erect a new building at the foot of Wood Street in Portland for the manufacture of steel fixtures, tools and castings. The Tennent Steel Casting Co. also has plans for a new building at Tacoma.

The Woolwine Metal Products Co., Los Angeles, is erecting a plant at Fifty-second Street and Riverside Drive. The main building, 185 x 300 ft., will be used for the manufacture of galvanized iron buckets, irrigation pipe and kindred products. Separate buildings will be erected to house the galvanizing department and the ceiling factory.

The United States Steel Products Co., San Francisco, has leased the entire 14th floor in the new Russ Building, and will move to its new quarters from the Rialto Building about Sept. 1.

The International Aircraft Corporation, 1241 West First Street, Long Beach, Cal., has been organized to build aircraft. The company has its own factory and is equipped to build 10 planes per month.

The Prescott Iron Works, Seattle, builder of saw mill machinery, has been merged with the Prescott Co., Menominee, Mich., engaged in the same line of manufacture. The business will be removed to Seattle and additions will be made to the plant there.

Canada

TORONTO, July 18.

MACHINE tool sales in this market are being maintained at a fairly good level. Dealers and builders report a steady flow of new orders, the greater part of which are in units of two or three, but with some lists of from six to 12 tools. While the trade looked for a drop during July and August it has failed to appear so far and it is now believed that this month's business will be on a level with that in June. Announcements made recently indicate several new plants and additions to established ones, which assure a good demand for equipment for several weeks and some inquiries are already out.

In addition to purchases in this market by Canadian buyers, imports of machinery and machine tools from the United States during the month of April had a value of upward of \$750,000.

Bids are being received by H. D. Goode, clerk, North York township, Willowdale, Ont., until July 25, for one 600 Imperial gal. per min. centrifugal pump, 330 ft. head, with electric motor. G. H. Baker is township engineer.

The Goderich Mfg. Co., Ltd., Anglesea Street, Goderich, Ont., whose plant was recently destroyed by fire with a loss of \$50,000, will start building operations on a new main plant at once and work on two other buildings which were under construction at the time of the fire will be continued. A quantity of new wood-working machinery and tools will be purchased.

The Canada Cement Co., Lakefield, Ont., will start work at once on the erection of a machine shop.

The Brockville Welded Products, Ltd., Brockville, Ont., has been formed with a capital stock of \$40,000, and it is reported that the company will erect a local plant. James M. Dobbie, Brockville, is interested.

Plans are being prepared by C. A. Meyers, chief engineer Firestone Tire & Rubber Co., Hamilton, Ont., for an addition to its plant. Tenders will be called on completion of plans.

Bids will be called at once by the Hamilton Street Railway Co., Terminal Building, Hamilton, Ont., for the con-

struction of car barns and other structures to cost \$300,000. The architects are the engineering department of the railway company, and B. H. Prack, 608 Lister Building.

Plans have been prepared by A. G. Stringer, 53 McLean Avenue, Toronto, for the construction of a \$75,000 factory at the corner of Spadina Avenue and Fleet Street, Toronto, for the Hobbs Storage Battery of Canada, Ltd.

The Town Council, Middleton, N. S., will spend \$16,500 on improvements and extensions to the electric light plant.

Western Canada

The ratepayers of Nelson, B. C., passed a by-law authorizing the expenditure of \$30,000 on a waterworks plant.

The X. L. Sand & Gravel Co., Ltd., has started work on the construction of a brick plant at Duncan, B. C., to cost \$50,000.

Foreign

THE United Steel Works, Düsseldorf, Germany, is planning for the sale of a bond issue of \$34,250,000, a portion to be sold in the United States, the proceeds to be used in part for expansion and betterments, including the purchase of the Thyssen company, one of the units of the merger. It is understood that the issue for this country will be handled by Dillon, Read & Co., Nassau and Cedar Streets, New York, investment securities.

The Longitudinal Railway of Chile, Iquique, has arranged for a fund of 9,000,000 pesos (about \$1,080,000) for the construction of new branches, sidings, etc., on its Iquique-Pintados branch, including the purchase of equipment, rolling stock, operating machinery, etc. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington; also at the American Consulate, Iquique, Harry Campbell, consul.

Stuart, James & Cooke, 17 Battery Place, New York, engineers, have contracted with the Soviet Concessions Committee of the Russian Soviet Government for the rehabilitation and development of coal mines in the Donetz and Moscow Basins, including the opening of four new coal mining properties. The project is expected to require about 36 months for completion and will cost about \$15,000,000 with power equipment, tipples, mining machinery, transportation facilities, etc.

The Goodyear Tire & Rubber Co., Akron, Ohio, has completed negotiations for the purchase of a plant at Wolverhampton, England, consisting of a tract of 70 acres and group of buildings, for a new branch plant. The initial works will provide for an output of about 2000 tires and tubes per day. This will make the sixth factory of the company in different parts of the world. As recently reported in these columns, work will soon be placed under way on a new mill near Sydney, Australia, to be equipped for an output of 1400 tires and tubes per day, operated in the name of the Australian Goodyear Co., Ltd.

The Municipal Council of Cali, Colombia, Senor J. M. Guerrero, president, is disposing of a bond issue of \$2,000,000 in the United States, a portion of the fund to be used for extensions and improvements in the municipal water system, including the installation of power and pumping machinery, pipe lines and other equipment.

The Whitney Mfg. Co., Hartford, Conn., manufacturer of chains, keys and key cutters, proposes to increase its capitalization from \$150,000 to \$1,500,000. The company was organized in 1896 with a capital of \$50,000. Later it absorbed the Woodruff Mfg. Co., Hartford.

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